

doc 318

Typed from original by C. Ross  
in 2002 ±

BOOK 3

Leonardian and Wordian notes

(and a few other notes; Oklahoma, revisited some Wolfcampian sections, etc.)

C.A. and J.R.P. Ross, Summer 1959

PG. 1

7/8/59

Brooks Ranch Section 2

1) Shale, blue-gray, 1/4"-1/2" bands of brown siltstone - 10'.

2) Covered - 15'.

---- Top of Lenox Hills fm <-> Base of Leonard ----

3) Limestone - light gray to light gray weathering 3" to 2' beds, very fine fossil hash for most part - fusulinids in thin beds within this unit.

Collection 2-3A - 8' up

Collection 2-3B - 22' up

Collection 2-3C - 37' up

-- shale interbeds gradually thicken to 6" or so - 48'.

4) Limestone, like below and shale, light brown to light gray - limestone are 1' to 1.5' thick, shale beds are 1.5' to 3' thick - 27'.

5) Limestone, light gray to light brown, very fine grained, clayey and silty - 3" to 2' beds -

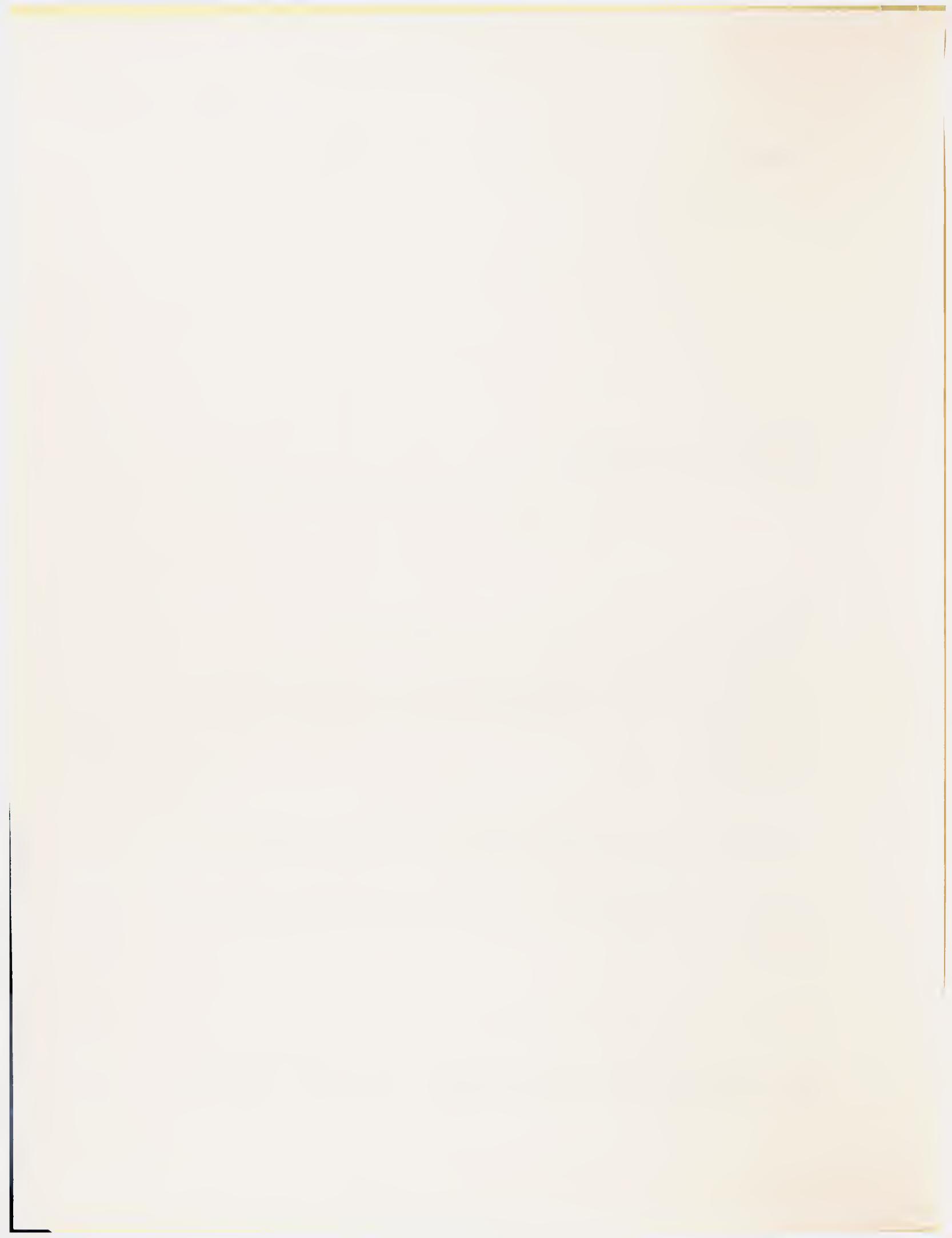
Collection 2-5A - 12'

Collection 2-5B - 35'

PG. 2

Collection 2-5C - 52' up; --total for unit --95'

6) Dolostone, light brown weathering; and shale (covered mostly) - light brown-gray very fine limestone near top 1' to 3' beds -



Collection 2-6A - 33' up, Coll. 2-6B - 85' up----- 112'

7) Limestone, light gray-3' to 6' beds, few and thin shale interbeds. Coll. 2-7 - -  
----- 32'

8) Limestone, light orange-brown weathering, very fine frag.;  
3' to 5' thick separated by 2-7' shaly intervals. The limestone have a "Staffella"  
fauna, and locally scattered "fusulinids" - - - 90'.  
Cyclothsems—10 to 12 - get progressively more shaly toward top of unit.

9) Limestone, orange-brown weathering, 1' to 4' beds. *Omphalothrocos* type  
gastropods.

PG. 3

7/9/59

near base - fusulinids recrystallized

Collection 2-9A - 42' up (Top of ridge 140')

Collection 2-9B - 145' up

Limestones become progressively more silty and change to light gray  
weathering.

Collection 2-9C - 160' up

Collection 2-9D - 185' up; total ----- 215'

10) Limestone and dolostone, orange-brown weathering - very silty - 2" to 6"  
beds - shale interbeds up to 1'.

Collection 2-10A - at 5',

Saddle at 80'

Collection 2-10B - 105' up

Rose colored dolo 3' separated by 4' of orange weathering silt-clay stem. Cyclic  
beds become.

{note: illustration:

bed 2: silty limestone (+-)

bed 3: silt-sand, silt-clay

bed 4: dolo pink to orange}

PG. 4

fusulinids are rare - recrystallized when found. Gastropods - brachiopods and  
ostracods, locally abundant. - 187'.

11) Shale, light gray, and limestone, light gray - shale - 2-5' beds. Limestone -  
1/2 to 1' beds.

Collection 2-11A - 5' up.

at 35-50' *Ophalothrocos* outlines common  
limestone is porous and recrystallized). - 89'.

12) Limestone, conglomerate, well sorted - 25'.



13) Sandstone, light brown silicified crinoid stems and brachiopods well sorted, fine grained - grade vertically into calcarenite. Collection 2-13A - 32'. 105' top of ridge to saddle -  
thickness of unit--158'.

PG. 5

14) Dolostone - brown-gray, porous, sacchoidal, weathers to pitted surface - 3 to 6' beds - 10'.

15) Limestone, light gray, 6" to 2' beds - little in the way of shales or siltstone.

2-15A - 42' up

2-15B - 65' up

Several different limestones in this unit - all are very fine sand size or lutites limestone. The more rubbly beds are white, sand size and are brown-gray. 4 or 5 alteration of grain size. -  
total for unit -  
- 205'

16) Limestone, orange-brown weathering, [relict outlines of fusulinids (abundant) 5' at base]. Like 15 below.

Collection 2-16A - 53'.

[at 65' a mottle quartz ss. bed with shell fragments]

[at 97' - silty bed 1', brown-orange, brachiopods].

Collection 2-16B -at 185'.--- total for unit --197'.

PG. 6

17) Sandstone, orange-brown weathering very silty, calcareous cement - 3" to 1' beds. at 30' a shell hash - recrystallized, no fusulinids, but has crinoid columns.  
-----42'.

[base of Leonard Facies?]

18) Limestone, gray-brown weathering, 1' to 3' beds, pock marked, silt and fine calcarenite for most part. [22' recrystallized fusulinids abundant] [ 154' and 3' conglomerate bed, including quartz, quartzite, chalcedony pebbles to 1.5" diameter].---157'

[West?] Afternoon looked at the rest of the Leonard fm., lower part of Word fm. There isn't much difference between the Hess facies and these upper units this far east [west?]. King's Sect. about 2 miles east is supposed to be quite markedly different in the 2 facies of the Leonard fm, but can't say that is true here.

PG. 7

{note: attached illustration of beds}

[From the top of these hills one can see beds in the Leonard fm thicken and thin within short distances. The units of brown-gray dolomite limestone may change



from 120' to 0' thick in 300 yards. Thus there seem to be few "key horizons" in this interval - We have 3 or 4 chert pebble conglomerate zones near the top of the Leonard, a couple of conglomerates in the Hess facies - and that is about all. Even these are probably not of great regional significance as they are mostly 3 to 6" conglomerate lenses (near the top of the fm), and the ones lower are calcirudites with locally derived pebbles and cobbles of limestone.

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- 18) cont. chert frag. scattered throughout upper 150'; pebble bed at 190' - 3" pebble band - -----293'.
- 19) Limestone dolomite, light gray to light brown weathering, 1/16 - 1/8" laminate of limestone alternating with dolostone - 2'. Dolostone [algal laminae?? supratidal?]

PG. 8

- 20) Dolostone, light brown pitted surface - 15'.
- 21) Like 19 - 8' [algal laminae?].
- 22) Like 20 - [20-28' up - quartz frag. conglomerate thin pebbles - 74'].
- 23) Limestone, light gray, with some 1/8" bands of irregularly bands of dolomite, 6" to 1' beds -  
Top of ridge (Fulk ranch)  
Locally angular limestone pebbles and cobbles make 6" beds.
- 24) Dolostone brown-gray, with Leptober outliers, in 6" to 2' beds pebble conglomerate 6' up 3" band - 37'.
- 25) Limestone, brown-gray, shelly, Collection 2-25A - 5' up.

PG. 9

Collection 2-25B - 24' up - 3" bed of fusulinid "cochina"  
[P. iveri Collection] - 42'.

- 26) Limestone, light gray, poorly bedded. 2' to 3' beds, weathers crumbly - [65' up - crinoid columnal hash - 2'] [local intraformational conglomerate - limestone pebbles] - 185'.
- 27) Sandstone, brown, red-orange, very fine quartz sand - 5'.
- 28) Limestone, blue to purple-gray, irregular wavy bedding- 42'.
- 29) Limestone, light gray, massive 2'-3' beds, excellent silicified faunal of gastropods, Brachs ?, pelecypods. - 12'.

PG. 10

- 30) Limestone, light gray, to white, fossils replaced by calcite, 4' to 6' bed, 30' (Cretaceous K?).

PG. 11

7/10/59

Allison Ranch, Section 1

Covered below on this west side of road -

- 1) Limestone, brown, silty and sandy, 3" to 1' beds - 4'.



- 2) Sandstones, cream, lime cement, cross bedded, 3'.
- 3) Limestone, dark brown-gray, - 3' black, dense.
- 4) Covered - shale and marly limestone. 18'.
- 5) Limestone, like 1, silicified fossils - 8'.
- 6) Covered - 7'.
- 7) Limestone, like 1 and shale above it, collection 1-7 [Fusulinids] 5'.
- 8) Limestone, like 1- gastropods - 1'.
- 9) Covered - 8'.

PG. 12

- 10) Limestone, gray-brown, 2" to 6" bedding, 3', 6" of rubble beneath - Collection 1-10.  
Fusulinid cochina - 4'.
- 11) Limestone - yellow-brown, vertical fracture - rubbly weathering, Collection 1-11. - 5'.
- 12) Covered - 9'.
- 13) Limestone, brown, fossil hash, fusulinids and Ornaphalotrochus gastro - 1'.
- 14) Covered - shale? - 4'. Collection 1-14.
- 15) Limestone, like 10 - 1'.
- 16) Covered - 3'.
- 17) Limestone - like 10 - 2'.
- 18) Covered - 4'.
- 19) Shell-hash - everything in gastropods, echinoids - 6".

PG. 13

- 20) Covered - 10'.
- 21) Limestone, yellow-brown, fine grained calcarenites - Collection 1-21 - 2'.
- 22) Limestone, light yellow-gray, marly - 3" to 6" beds - 5'.
- 23) Covered - 29'.
- 24) Limestone - dark gray, 6" bedding - recrystallized fossils - 8'.
- 25) Covered - 12'.
- 26) Limestone, yellow-brown weathering and fresh, graphic recrystallization - part - 3'.
- 27) Covered - 15'.
- 28) Limestone, gray-brown, 1' to 2' beds - fine shell hash - 10'.

PG. 14

- 29) Covered - 37'.
- 30) Limestone, light brown, indistinct lamination, 6" to 1' beds - 7'.
- 31) Covered - 13'.
- 32) Limestone, light yellow-brown - 4'.
- 33) Covered - 11'.
- 34) Limestone, medium gray-brown, 3" beds - 3'.
- 35) Covered - probably more shaly interval of 34 - 12'.
- 36) Limestone, orange-brown, 6" beds, silty and sand (very fine grained) - 8'.
- 37) Ss., white to very light gray, cross bedded - 15'.



38) Limestone, yellow-brown, very sandy, massive - 3'.

PG. 15

- 39) Covered - 8'.
- 40) Limestone, brown-gray. 3" beds, recrystallized fossils - 2'.
- 41) Covered - 7'.
- 42) Limestone, medium gray-brown, 6" beds small fusulinids? 3'.
- 43) Covered - 4'.
- 44) Limestone, light brown-gray, silty, recrystallized fossils, several shale beds 6", beds 6" - 12'.
- 45) Covered - 11'.  
-----Subtotal 356'
- 46) Limestone, light gray, fine grained, dense - 2'.
- 47) Covered - 4'.
- 48) Limestone like 46 - [2'?] Collection 1-55 -
- 49) Covered - 6'.

PG. 16

- 50) Limestone like 46 - 1'.
- 51) Covered - 2'.
- 52) Limestone, orange-brown, silty, shell hash - [2'?] Collection 1-55 -
- 53) Covered - 22'.
- 54) Limestone - brown-orange, sandy and silty, 6" beds; and shale 4' to 6' beds - 24'.
- 55) Limestone, fusulinid cochina, gray-brown, 6" beds.
- 56) Covered - 9'.
- 57) Limestone, dark gray -shell hash - 6".
- 58) Covered - 8'.
- 59) Limestone, like 57 - 1'.

PG. 17

- 60) Limestone, orange-brown, sandy and silty - 2'.
- 61) Covered - 3'.
- 62) Limestone, gray-brown, sandy, silty, shellhash, 6" beds- 1'.
- 63) Siltstones, brown to yellow weathering, partly covered, - 17'.
- 64) Sandstone and siltstone - 2'.
- 65) Limestone, light brown-yellow, 1' beds - 3'.
- 66) Covered - 37'.
- 67) Ss., purplish-gray weathering - 2'.
- 68) Limestone, gray-brown, shell hash, 3" beds - Collection 1-68 - 61'.  
-----subtotal 160'
- 69) Ss., orange-yellow weathering, 1' beds - 3'.

PG. 18

- 70) Covered - 10'.



71) Ss., like 60 - 9'.  
 72) Shale, gray in 5-15' bed, alternating with ss in 6" beds - 53'.  
 73) Ss., like 69 - 3'.  
 74) Shale, gray; friable ss (white and purple) and 6" ledges of 38'.      resistant ss -  
 75) Ss., like 69 - 3.5'.  
 76) Covered for most part - some purple-brown limestone with crystals, and ss. - 22'.      large calcite  
 77) Ss., like 69 - 2.5'.  
 78) Shale and Ss., (orange) - 22'.  
 79) Ss., gray to brown, cross bedded - 6'.

PG. 19

80. Ss., orange-brown, like 69 - 12'.      -----Subtotal 184'  
 81) Limestone, light to medium gray, chert frags, common, 2' to up an orange-brown weathering silty limestone] - 45'.      3' beds. [27'  
 82) Ss., - light brown - grades vertically into silty fine grained {note: illustration followed} - 15'.      limestone  
 83) Like 82 - 17'.  
 84) Like 82 - from limestone at top-Collection 1-84 - 12'.      -----Subtotal 44'  
 85) Limestone, gray-brown, 6" to 2' beds fossil hashes - 25'.  
 86) Like 82 - 12'. Limestone has algal plates.

PG. 20

87) Limestone, blue-gray, 3" to 6" beds, fine shell hash, recrystallized fusulinids in a few beds - 35'.  
 88) Covered - one or two thin limestone ledges - 22'.  
 89) Limestone, medium-gray, ironstone nodules common, 6" to 2" beds, fossils recrystallized. - 35'.      -----Subtotal 92'  
 90) Shale and Ss., - 7' to 10' bed alternating with limestone, dark gray - 52'.  
 Traversed NW 150 yards.  
 91) Covered - 11'.  
 92) Limestone, medium gray, brown "tubes" on weathered surface. 1/2'.  
 93) Covered for most part, ss. orange, limestone purple and siltstone yellow, outcrop in patches - 3.5'.      -----Subtotal 95.5'

PG. 21

94) Limestone, medium gray, 2" to 2' beds with some covered intervals - 34'. Calcite crystals - replaced fossils?  
 95) Covered - 7'.  
 96) Limestone, mottled gray and orange-brown weathering 3" to 6" beds - 11'.  
 97) Covered - 21'.



98) Limestone, medium gray, silty and sandy - 2'.  
 99) Largely covered, probably siltstone, also every 4' to 10', a 6" ss (orange-brown) crops out - 48'.  
 100) Limestone, light gray, very silty, sandy, clayey, persist at beds - 2'.  
 101) Shale, largely covered, and Ss. 2 beds, orange-brown - 8'.  
 102) Covered, except for 3, 6" beds of ss - 31'.  
 103) Ss., orange-brown, limy cement, massive - 2'.  
 -----Subtotal 122'

PG. 22

7/12/59

Section 3

Western part of Brooks Ranch

remeasured King's Sect. 26 (probably closer to sect. 27 of King (King's 30) His bed numbers as shown in his sec. 26.

King's beds

9) = S. crassitectoria zone with large *Omphalotrochus*  
 Collection 3-(9)A first appearance at base of bed  
 Coll. 3-(9)B - 35' up. -----108'  
 10) Collection 3-(10)A - 5' up.  
 Collection 3-(10)B - 50' up. -----270'  
 11) Double Ledge  
 Coll. 3-(11)A - 2' up.  
 12) Collection 3-12X - 2 bag 15' up.  
 Collection 3-12XA - 35' up.  
 Staffella are common throughout the lower beds - (9) through (12)  
 13) Second ledge Coll. 3-13-A - 30' up.

PG. 23

14) Coll. 3-14A - lower limestone ledge  
 Coll. 3-14B - top of unit.  
 Coll. 3-14C - algal bed.  
 16) Coll. 3-16 - 15' up.  
 Coll. 3-16B - 35' up.  
 17) Coll. 3-(17)  
 Coll. 3-17B - in section, 50' up.  
 Base of King's fossil bed is a conglomerate.  
 In Coll. 3-17B fusulinid occur with gonatite, s camacatochid, Omphalot, Thindeus.  
 18) Coll. 3-18A - base of bed we think King's pisolite bed, pisolites are fusulinids with algae coatings.  
 Coll. 3-18B - 35' up.

PG. 24

Near top of King's bed 19 or in the base of bed 19 - red siliceous shale and siltstone - 10' +- thick.



The lower part of King's section was much easier to follow than the upper part. This might be in part the result of the topography for beds 14 and higher are exposed on the top of the mountain. Here again there seems to be a change in lithology at the interval of the Hess fossil bed and just above and below - Thus, although we tried to follow the route of the measured section it is possible we missed it in the upper units.

The fossil bed is a pretty poor unit here and is not the resistant cliff it is to the west.

Fusulinids (often recrystallized) really make up a lot of this interval above and below the Hess fossil bed.

PG. 25

7/14/59

With Cooper, Grant, Skinner and Wilde, and Stehli.

Collected from Hess ranch horst and from the Word about 1 mile NW of Hill 5779 north of Leonard Mt.

Word 1 limestone - 35' - 3 collections.

Word first shale Collected 5-2A Word - 35' up.

Word first shale Collected 5-2B - 45' up

5-2C - 65' up

Limestone becomes more abundant and the upper 50' are 2' to 3' limestone beds -

Collected 5-3A - 15' up.

Collected 5-3B - 20' up. -----Total 140'.

Word limestone - position of second limestone -

Collected 5-4 - ----- 7'.

Shale-----155'

Word - 1' beds of limestone -

Collected 5-5A - [near base]

Collected 5-5B - 5' up. -----10' [I think this is what the notes mean.]

PG. 26

Shale ----- 20'

Limestone - Collected 5-6A. -----2'

Shale ----- 20'.

Limestone - base third Word limestone- Type locality of Paraf, sellardsi according to Skinner. Collected 5-7A. ---- 3'.

Shale - 12'.

Cephalopod zone - 2' limestones at base of next limestone, medium gray (upper part of third Word limestone[?]) - no fusulinids ----- 65'.

The first Word limestone is thinning to the NW - mainly at the top by intertonguing with siliceous shale - The limestones just below Word limestone 2? are fine



grained lutites, and a few 6" limestone are rare (2 or 3) between second limestone Word and third limestone. Cooper pointed out a high Leonard limestone locality just north of the road up Gilliland Canyon at the base of the Word fm.

#### PG. 27

It seems that Cooper's "Hess Ledge" can be traced around the end of the ridge behind the Hess ranch House and behind the horst to a point opposite the gap between the hills in the horst. He doesn't find this fauna on the front of the limestone escarpment to the south (Hess escarpment) because in his words "it isn't the right lithology". Thus he would rule out the idea that his fauna occurs in several horizons.

Wilde is using the first Leonard limestone of King (1930) as equal to the Hess fossil bed. - This seems to solve a few problems - but I wonder how many?

The section we measured in the Word seems to best fit in with King's 1930 Sect. 18, p. 71, but this on depositional strike 2.5 miles +- to the NE.

#### PG. 28

7/15/59 [Old Word Ranch]

Split Tank

Collection 3-(19) from upper dolomitic limestone in Hess facies - most of this is a crinoid cochina - 15' below top. (maybe in lower limestone of Leonard).

Collection 3-(2) Leonard -[3-13]. The upper beds of Leonard (2) have abundant fusulinids.

Road to Red Tank

Word first limestone - has limestone cobbles in the upper unit. Overlain by 15-20' of siliceous shale followed by dolomitic #2 limestone.

Collection from float near top of first limestone.

Collection - 4 to 5' above Word limestone #2.

#### PG. 29

The fourth Word limestone and the Vidrio are dolostone facies for most part here. They like the Upper 250' of Hess facies locally they have abundant relict outlines of fusulinids but we couldn't find any that were well preserved.

The Split Tank Leonard section is faulted in several places and we were able to follow King's section in only a general way. Cooper said each limestone was a lense which pinches out within a short distance and each of these apparently contains a distinct brachiopod assemblage.

#### PG. 30

7/16/59--Hess Ranch

Loc. 2 Word limestone; second limestone by the road north of the horst - This is apparently second or third limestone - in the field I judged it to be the second limestone - or #1.



Loc. 3 Word 4 limestone - [Collection] A-12' up in ledge probably #3 [Word Limestone]. 3/4 mile up valley [Collection] B-16' up in ledge, from earthen tank. This is not too close to the massive beds at the top of the ridge - which King calls Vidrio - say 125' to 150' below the Vidrio - The sequence is a silty, dirty limestone in 2" to 6" beds with a few scattered fusulinids in some of the more indurated beds -

[See later page for Word 4-Vidrio Section.]

PG. 31

Road Canyon, East end-meager collection from Word third limestone

-----35' up (A)

{note: illustration:

- bed 1: 3rd limestone, goniatite bed, --35'.
- bed 2: orange-brown ss., with a few thin (6") yellow-gray limestone.----250'.
- bed 3: limestone silicified - 6'.
- bed 4: shale or covered ---145'.
- bed 5: limestone 7' silicified fossils. ----7'.
- bed 6: Ss., orange-brown, ---120'.
- bed 7: dolo-limestone, ---25'.
- bed 8: Sandy dolomite limestone, ---18'.
- bed 9: dolo-limestone, ----3'.

PG. 32

There is a fault cutting the SE face of section at Road Canyon - also several Terra Blocks have dropped down. The Word 4 limestone lenses are just about gone here with the Vidrio dolo. lying conformable but with an abrupt lithologic change. [probably unconformity here]

PG. 33

7/17/59

Sect. 5 Leonard Mt-

- 0) (see p. 36, 2 pages over) Covered below - mainly dolomitic and limestone interfingering in tongues and patches.
- 1) Limestone, medium to dark gray or fresh surface, massive 10 to 20' beds, Sacchinella zone of G.A.Cooper, weathers to rounded surfaces, one 5-6' zone of shaly 1' limestone beds 65' up ---112'.
- 2) Limestone, dark gray, 1 to 2 foot beds, crinoid and bryozoan fragments - 43'.

Leonard Formation±

- 3) Limestone, medium to dark gray, 6" to 2' beds, caps ridge, a few pits, angular weathering - conglomeratic locally - 37'. Collection 5-3.
- 4) Limestone, dark gray, 3" to 1' beds - 12'.
- 5) Calcirudite, 4" cobbles, with 4' of dark gray 6" limestone, in middle - 34'. top of ridge. Collection 5-5 Leonard anthill top of ridge.
- 6) Limestone, light gray, shell hash, silicified in part - 3'. [Wilde's locality - Collection 5-2 gully probably about bed 2].



PG. 34

- 7) Covered in part, thin limestone (dark gray) and siliceous shale - King's fault zone - but no fault here. Silty limestone and shaly limestone in part - 18'.
- 8) Calcirudite - light gray, massive, 2-5' beds, 16'.
- 9) Calcirudite, dark gray limestone matrix, 6" bed, 21'.
- 10) Limestone, light gray, 2' beds, (calcarenite), one brown bed (Collection 5-10 [??]) 5' up - 20'.
- 11) Calcirudite, dark gray matrix - 12, 3' cobble.
- 12) Limestone, 2" crinoid columnal bed, light gray, 5-6' beds - shell hash - calcarenite -  
5-12A - 3' up.  
5-12B - 8' up.-----38'.

PG. 35

- 13) Calcirudite, dark gray limestone matrix, 2" cobbles --- 6'.
- 14) Calcirudite, light gray grading virtually into shell hash - several of these cycles repeated - (3)---37'.
- 15) Shale, siliceous, red and orange ---- 33'.
- 16) Conglomerate, limestone matrix and a few cobbles, chert fragments - 2' --> 6'-7' to SE 100 yards ---- 2'.
- 17) Shale, orange - siliceous, platy. ---- 32'.
- 18) Limestone, light gray, massive, silicified fossils, chert frags conglomerate near top - ---56'.
- 19) Shale, orange-brown, with 1'-2' limestone beds (conglomeratic chert pebbles) ---- 67'  
silicified cochina.
- 20) Limestone, light brown-gray, 2'-3' beds silicified bands - ---17'.

PG. 36

- 21) Shale orange-brown, silicified. [continued below]

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0) [cont. from 2 pages ago] base of Hess ledge rest unconformably on truncated edge of Lenox Hills fm. 3' relief, 5° difference Lenox Hills, dips more south.  
Collection 0-A, 10' below unconformity.  
Collection 0-B, 1' below unconformity.  
Collection 0-C, 1' above in Hess ledge.

---

- 21) Shale, orange-brown, silicified, top 6" beds of sandy limestone ---- 47'.
- 22) Shale, orange weathering (black fresh) with 1"-3" shell hash band - ---- 55'.
- 23) Covered ---- 115'.
- 24) Shale and siltstone orange ---- 23'.
- 25) Limestone, black, shell, bryozoans and brachs ---- 6'.

PG. 37



26) Siltstone, yellow-orange, becoming near top was a fenestellid heaven  
-----24'.

27) Covered, mostly gray shale ----- 87'.

28) Conglomerate, chert frags, brown weathering, many bryos and brachs  
silicified ----- 1.5'.

29) Covered, mostly gray shale and a few 6" silt and s.s. (orange) bed-shell  
hashes - ----146'.

30) S.s., orange-brown, brach shell hash, Collection 5-30 (Leonard ) -  
-----12'.

31) Covered - 86'.

32) Word limestone. Here it has a s.s. at the base, 2-3' beds orange to brown-gray; 20' above we get a massive calcirudite.----100'+

PG. 38

7/18/59

Rained out--Saw G.A. Cooper and Dick Grant in town

7/19/59

Section 4 [ +- King's section 23]

1) Silt --- 20'.

2) Shale, brown, with thin clay rich dolomitic limestone ---72'. Collection 4-  
2; 6' down from top.

3) Limestone, brown-gray weathering with large calcite crystals - -----4'.

4) Shale, brown, and thin limestone. 4-4A - 5' up. 4-4B - 11' up. - ---  
23'.

5) Limestone, brown-gray, 2' beds, calcite crystals in long "bodies" - -----13'.  
[9/2000 Middle transgression in Lenox Hills Fm]

Top of Lenox Hills Fm with an unconformity with 5' to 8' relief in 200 yards -

6) Limestone, medium to dark gray, calcarenite, many fusulinids - 2' to 4' beds.  
Collection 4-6A - --- 3' up.

PG. 39

and shaly limestone - 'snail' limestone  
Coll. 4-6B is 15' up,  
Coll. 4-6C - 23'. {note: illustration followed}.  
2 cycles of limestone 6' to 8' and shale 18'-20' --- 52'.

7) Limestone, light gray, with brown-orange chert concretions - massive.  
Collection 4-7A - ---- 16'.

8) Shale and limestone, brown and light brown weathering - varicolored shales  
and white ss. 25' up - --- 32'.

9) Limestone, brown-gray, 4" to 3' bed - mottle zone 1' at base. Small  
recrystallized Staffella are common throughout -17'.

10) Shale and shaly limestone - 6" bed of white s.s. --- 12'.

11) Limestone like 9 - 10'.

PG. 40

[base of Hess Ls.]



12) Limestone, gray, 1'-2' beds, vertical fracture on weathering. Collection 4-12A - 3' up.  
 Collection 4-12B - 12' up.  
 Coll. 4-12C (Problematical fossil)- 22' up.  
 Coll. 4-12D - 32' up. (and top of bench) ---32'

13) Limestone, dark gray, calcarenite, 6" to 1' beds.  
 Collection 4-13A - 20' up. ----- 23'.  
 Follows Neal fence here upwards

14) Shale, brown, grades upward into clayey limestone and finally into a calcarenite at top.  
 Collection 4-14 at top - ---- 27'.

15) Limestone, light to medium gray, 6" to 1' bed.  
 Collection 4-15A - 12' up.  
 Collection 4-15B - 50' up.  
 Shaly beds commonly reach 10-15' in this unit.  
 Coll. 4-15C - 78' up. ---106'.

PG. 41

16) Limestone, medium gray, little shale, 6" to 2' beds, rubbly in part -  
 Collection 4-16A - 3' up.  
 Collection 4-16B - 25' up.  
 Several beds of dolostone common very fine calcarenite - becomes dark gray above 30'; light gray above 42'.  
 Collection 4-16C - 43' up.  
 Collection 4-16D - 58' up. ----- 59'.

17) Limestone, light gray, silty, 3" to 1' beds rubbly - with thin shale bands - small "Staffella" fusulinids common in all beds - above 33' dark gray - small, subcylindrical fusulinids replaced by dolomite (47') --- 52'.

18) Dolostone, brown-gray and limestone, gray-brown,  
 Coll. 4-18A - 11' up --- 27'.

19) Limestone, light gray, 2'-4' beds, silty, clayey; ---37'.

PG. 42

20) Limestone medium gray to light gray, thin bedding 2" to 6", and shale and siltstone, dolomitic;  
 Collection 4-20A - a 2' calcarenite 26' up ----- 37'.

21) Limestone, light gray to cream, massive 3' to 5' beds with thin bedded medium gray limestone.  
 rubbly bed Collection 4-21A - 30' up.  
 rubbly bed Collection 4-21B - 35' up.  
 rubbly bed Collection 4-21C - 42' up. --- 54'.

22) Limestone, light gray, 2" to 4" beds, fossils are common but dolomitized - -----82'.

23) Limestone, light gray, massive, 2' beds.  
 Collection 4-23A - 17' up.  
 Collection 4-23B - 29' up. --- 34'.



PG. 43

24) Limestone, light gray to cream, thin irregular beds, 2" to 4" beds -  
laminated, Pink tones about 65' to 80'. -----87'.  
25) Limestone, light brown-gray, wavy bedding, in beds 2' to 3' massive,  
clayey and silty.  
SEVERAL SMALL FAULTS ----- 97'.  
26) Limestone, medium gray, 2' beds, with brown shale cycles of these, the  
shale gradually becoming dominant --- 193'.  
[up to Hess - Neal gate. This is very near the base of the Hess Fossil  
Bed]

PG. 44

7/20/59 -[walked about a 1/3 to 1/2 mile east along bed 26 and found section  
better exposed and better preserved]  
Coll. 4-26m - 1/2 mile east of section 4, 25' below fossil bed.  
Coll. 4-28mB - 1/2 mile east of Sect. 4, from a 35' to 40' light gray limestone  
above fossil bed. - 8' up.  
Coll. 4-28ma - 5' up.  
Coll. 4-27ma - fossil bed, silicified just above 2-3' limestone ledge 15' beneath  
top.  
Coll. 4-28mc - 35' above fossil bed.  
Coll. 4-29ma - massive limestone about 25' above top 4-28.

PG. 45

27) Fossil bed, two lithologies  
a) basal calcirudite----- 28'.  
b) Shale and limestone, shale is brown; limestone is medium gray,  
abundant silicified fossils - brachiopods, collection of bryozoans, yellow silty  
limestone. -----27'.  
28) Limestone, medium gray, 1'-3' beds, dolomitic, chert nodules.  
Collection 4-28A - 42' up. *Omphalothrocos* common. Collection 4-  
28B - 64' up.  
Top of hill at 89'. Total ----- 115'.  
[?]Hess fossil bed includes bed 28; Leonard Fm bed 29 to 34 [?].  
29) Limestone, brown-gray, 2'-4' beds, with lime mud blebs and chert  
pebbles ----- 24'.  
30) Shale and limestone, brown, siliceous shale; dolomitic or dolomitized  
limestone. 2' beds ----- 29'.  
31) Dolostone, dark gray-brown, 4' beds ----- 21'.  
32) Limestone, light gray, "graphic" dolo-limestone beds.--12'  
[Word Fm starts with bed 33].  
33) Limestone conglomerate (calcirudite) with chert frags 3-4'  
9'. beds - -----

PG. 46



34) Limestone and shale, siliceous, w/ chert nodules .----25'

35) Dolostone, brown-gray, pitted ----- 250' est.  
 Word 2A limestone, Coll. 4 --25' up.  
 Word 2B limestone (Coll.)-----50' up.  
 The following (2C and 2D) are 10-15' above the top of the second limestone and separated from it by siliceous shale and sandstone.  
 Word 2C limestone (Coll.) - 65' up (top).  
 Word 2D limestone-about same horizon as Coll. from Word 2C.  
 Word 2D is from saddle.  
 Word 2E - 25' above 2D; 35' below first massive limestone in Third[?] Word limestone.

PG. 47

Word third limestone A - 5' up.  
 Word third limestone B - 8' up.  
 Word third limestone C - 18' up.  
 ---35' total thickness of limestone.  
 Dolomite - 12' to top of ridge

Word first limestone - Collection 4-Word 1a, 20' below top of King's unit "a"

The Word limestone contain a lot of conglomeratic stuff at this place - most pebbles and cobbles of limestone probably intraformational in part, and fine chert pebbles - Where we saw the formation, the basal limestone (#1a is very little different from #1b although King's separation isn't too bad. The distance between #1 and #2 is closer to 83' than 14' and I think these members are reversed on King's 1930 page 143. The distance between #2 and #3 is a little high - unit 6 becomes limestone and unit 5 has fossiliferous limestone tongues in it. [This area is near the Wordian shelf break and thicknesses and facies change abruptly, so if we were offset a bit from King's line of section these differences would be understandable.]

PG. 48

7/21/59      Southside of Leonard Mtn.

The southside of Leonard Mtn. is complicated by:

- a) facies change
- b) irregular dolomitization of beds
- c) several faults

I have perhaps drawn the top of the Lenox Hills Fm. a little high but we'll let is stand for the moment - [Changes on] the Lenox Hills Fm is thin here as if on an eroded pre-Leonardian anticline.

Jail Canyon where road ends on map -

- 1) No Altuda shale on SW end of Hill 5789 - This is King's Capitan, upper member -



2) Vidrio = Capitan upper member apparently and it seems likely that Altuda shale and lower member [of Capitanian] are equal to upper part of Word. [In 2004, I don't think this was correctly interpreted and need to study this part of the facies transition much more thoroughly.]

PG. 49

Section 5 Jail Canyon

Section on East side of Old Blue Mt., Jail Canyon.

Covered below

- 1) Limestone, medium gray, 2-4' beds, gastropods and crinoid columns, recrystallized; - ---15'.
- 2) Limestone, (buff) light brown weathering, 6"-1' beds, siliceous bands ---- - 85'.
- 3) Limestone, medium gray, pitted weathering, surface, 2-5' bed (similar to unit 1); calcarenite lenses (Coll 3A).----51'.
- 4) Ss., orange-brown to light brown, weathering, 2" to 6" beds, a lot of calcite cement, "siliceous bands are irregular throughout unit - 112'.
- 5) Limestone, medium gray, calcarenite - 2' to 6' beds, silicified and replaced fossils -

Jail Canyon - Coll. 5A-about 3' up.

Conglomeratic in part- calcarenite, very fine to 1"-2" pebbles - Calcirudite. [See King's Sect. 16, unit 5]. -----about 20' 6) Limestone, tan, calcirudite and ss., pinches out to South - varies from 10' here to 30-40' on ridge 400 yards North.

PG. 50

7) Limestone, medium gray, 2'-3' beds, to top of Hill.

His unit 3 is missing where we measured section but becomes thicker to southwest - His units 3 and 2 = upper part of his unit 1. {note: illustration followed}. [This is the area of the upper Word and lower Capitanian shelf break so facies and lithologies are changing abruptly.]

PG. 51

[3 3/4 miles about N30°W of Skinner Ranch].

The Word limestone which King maps along the west side of Gilliland Canyon is probably his third limestone, not the first one. (Collection Iron Mt. road Word Limestone A) is from this - includes a few scattered fusulinids, cephalopods and a "scachinella" brachiopod. There seems to be no need for the fault further southwest. The top of the hill we climbed is a terra block. The Gilliland Anticline poops out to the south of this point and beds regain their 10° NW dip.

PG. 52

Blank

PG. 53



7/16/59

Elbow in Hess Canyon

[note: illustration]

Bed 1. Ss., and dolomitic limestone with silicified layers.--10-15'

Bed 2. Fusulinid hash. Coll. A. -----8'

Bed 3. Like #1. -----22'

Bed 4: Limestone, well-bedded, in 2' beds, fusuliniferous.

Coll. B in basal bed.

Coll. C, 2' up;

Coll. D, 18' up;

Coll. E 30' up. -----total about 35'.

Bed 5. Covered. -----45'

Bed 6. dolostone, Vidrio Member -----200'+,

PG. 54

Blank

PG. 55

7/22/59

Clay Slide - The upper part of Leonard is badly covered by terra blocks from the Word limestone above. [note: illustration]

Covered below.

Bed 1. Shale, ss., and orange limestone. two collections from float. CS-X1  
and CS- X2, -----35'+.

Bed 2. Covered -----90'.

Bed 3. Shale, black chert, and limy ss. in 2" beds; some fossil hash limestone  
lenses.-----14'.

Bed 4. Limestone (calcilutite) with lenses of shell hash,  
Collection A (CS-A.), 19' up. -----23'.

Bed 5. Calcilutite, papery limestone, light gray, 1" beds, Collection B ( CS-B)  
at 20'. -----37'.

Top of Ridge

PG. 56

Clay Slide

King's ammonite collection locality, 1/2 mile SW of King's dip symbol "12°". along road.

Sullivan Ranch Road and Clay Slide limestone cap - junction [where limestone  
that caps Clay Slide meets road]. 3 Collections:

20' -1) Word Limestone Coll. C - in lower 20' of gray limestone.

25' -2) Brown to yellow weathering bed.

35' -3) Word limestone Coll. D in lower part of massive recrystallized  
limestone 10' up.

Word limestone Coll. E, 6' below top of ridge.



PG. 57

7/23/59

Morning - climbed from the "Hess" ledge up to the second Leonard limestone - made three collections based on King's Sect. 12.

The base of the Capitan at Sullivan peak is a beautiful unconformity - 40' or more relief and parallel bedding.

Afternoon - base of little knob of Coopers' SW end of Lenox Hills - base of hill shale and siltstone and sandstone dip 10°. to the S10°W. note: illustration:

Bed 1: First Ls, 35'. (3) Collection, C (Top).

Bed 2: S.s., orange-brown shale-gray. 85'.

Bed 3: Limestone, 3 Coll. 60', Second Leonard limestone.(Coop's Knob)

This section is cut by a fault or faults and the exact relation of the knob is dubious - it is probably the second Leonard limestone, but?

PG. 58

The Leonard fm in the Lenox Hills consists of series of limestone tongues which tend to become thinner to the SW and break up into a number of thin units by additional shale tongues. The structural problems are big especially in the area south of Sullivan Peak, between Dugout Mt. and the Altuda uplift. Of course, it is all covered but there is still a real problem to figure out.

King's map is wonderful, but his isn't very consistent about his boundary between the Word and Capitan - his Leonard and Word also have problems - the Ammonite bed which he places in the Leonard in the west is about the right horizon for his first Word limestone in the east. i.e.,[?] It seems the Word-Leonard boundary is also inconsistent.

The base of the Word in the west seems to be about the third limestone of the eastern Mts. In Section 12 this unit is greatly thickened and may represent the reef between

PG. 59

the hash reef faces to the east and the basin to the west.

PG. 60

7/25/59

Decie Ranch - Sullivan Peak

Collection from lower 25' of bituminous Word limestone of King's Sect. 12.

Collection King's Sect. 12 Coll. B float 25' below top.

Collection King's Sect. 12 Coll. C in place 20' below top.

Collection King's Sect. 12 Coll. D in place 10' below top.

(B and C and D are from King's section 12, bed 3.)



Kin'sg Word bed 4 is conglomerate - 3" to 4" limestone cobbles from younger [older] Word or Leonard limestone, some chert. Collection - King 12 - Word 4.

Collection King's Sect. 12, Word bed 5, 12' up.

Collection from King's Sect. 12, bed 6 (maybe 9 or 8).

Collection from float from King's bed 18, Sect. 12.

PG. 61

7/25/59

Iron Mt. Ranch

Section 5A

covered below:

- 1) Siltstone and shale, with thin platy sandstones, yellow-brown weathering, 1/4"-1" beds ---- 58'.
- 2) Calcarenite, medium gray weathering, fusulinids. 1' ledge, Collection 5A-2 ---- 1'.
- 3) Limestone, orange and gray weathering, fossil hash of brachs and fusulinids - Collection 5A-3 ----1'.
- 4) Limestone, orange-brown weathering, sandy fusulinids - Collection 5A-4 --- 2'.
- 5) Sandstone, yellow-brown weathering, limy, 1' to 6" beds - -----27'.
- 6) Limestone, medium gray, 1' to 2' beds, even bedding.  
Collection 5A-6A,  
Collection 5A-6X float ----- 2'.
- 7) Siltstone and sandstone, yellow-brown, with limy beds of same color - -----37'.

PG. 62

- 8) Limestone, medium gray, massive beds, 5' to 10' cliffs, thin irregular brown chert bands.----- 56'.
- 9) Siltstone and shale, covered for most part, yellow to light brown weathering, upper 15' becomes a sandstone. - -----123'.
- 10) Limestone, medium gray; basal 2-3 a calcirudite, becomes finer grained upwards, fusulinids common in a 6-12" band just above conglomerate.  
Collection 5A-10 ---- 8'.
- 11) Siltstone and shale, yellow to green-gray. ----- 48'.
- 12) Limestone, gray weathering, 3" to 1' beds, thin (1/2") shale interbeds. - -- 4'.
- 13) Sandstone, siltstone sequence, tan to orange-brown weathering ----- 62'.
- 14) Limestone, calcilutite, gray, 3-6" beds. ----- 5'.

PG. 63

- 15) Sandstone, orange-brown, 6" to 6' beds, calcareous cement.



----- 56'.

- 16) Calcilutite, brown-gray weathering, 2" to 3' beds, irregular bands of chert (3 cycles) nodules, grades upwards into quartz sandstone beds, at 56-60' there are several lenses of shell hash with silicified fossils - Collection 5A-16 at 60' ----- 137'.
- 17) Limestone, brown-yellow weathering, 6" to 2' beds scattered white chert patches, cliff forms, saccharoidal with purple weathering patches, pitted surface ----- 25'.
- 18) Limestone, brown-gray weathering, 6" beds ----- 17'.

Unconformity - 8' of relief in 100 yards along strike.

- 19) Dolostone, brown-gray, rubbly cemented by clear calcite matrix - forms top of ridge - 65'+.  
[Start here.]

PG. 64

Section 5. Section at West end of Road Canyon. 9°S dip to the S70W King's fault contact of the Word against Vidrio is true, although there is [also] possibly a fault 100 yards further up the hill.

Vidrio [top of section]

10. Dolostone, brown-gray with large clear calcite crystals and a calcite matrix (Collection of this) - to top of hill. Unconformable contact - several (2') of relief?  
[Top of Word, Fourth limestone]
9. Limestone, calcilutite, yellow-brown, 2"-6" beds with chert nodules - ---- 12'.
8. Ss., dark brown weathering, siliceous bands with calcarenous cement where calcite cement remains weather, light yellow-brown - -----32'.
7. Limestone, calcilutite, yellow-brown weathering, brown on fresh surface, 1' to 2' beds patches of chert crystals ---- 20'.

PG. 65

6. Limestone, medium gray, massive lenses 1' to 4' thick in rocks like above unit -----12'.
5. Limestone, yellow-brown weathering, brown chert nodules, 6" beds.  
Collection of fusulinid from here.----- 18'
4. Ss., dark yellow-brown weathering, 1' to 3' beds chert crystals - -----8'.
3. Limestone, yellow-brown weathering, brown chert nodules, 6" to 1' beds - -- 10'.
2. Ss., dark brown, siliceous ----- 6'.  
Probably top of third Word limestone
1. Limestone, light gray weathering, platy, - ---10' exposed.
0. Covered beneath.

PG. 66

Blank



PG. 67

7/26/59

Section 4A.

Examined the middle of King's Sect. 12, Lenox Hills, and remeasured it in part, see book [King 1930 section].

Then drove to Hess-Hall boundary fence and measured from road north to the top of the ridge and across the rolling slopes about 400 yards.

Section along Hess-Hall boundary fence.

1) Limestone, dark gray, silicified fossil hash, 3' to 6' beds.

----- - about 20'.

2) Covered, probably siliceous shale. ----- - 126'.

First Word limestone:

3) Limestone, medium-gray, finely laminated, very silty with bands of brown siliceous replacement, lenses of fossiliferous calcarenite, (Collection 10' from top) ----- 84'.

4) Dolostone, "dirty" gray, 5' beds, a yellow weathering limestone 6" about 20' up - -----40'.

Second Word limestone:

5) Shale, red-brown weathering ----- 10'.

6) like 4 below - -----about 30'.

PG. 68

Blank

PG. 69

7/27/59

Dugout Mt. Section

Section 7 - dip 14°WNW.

Siliceous siltstone below.

1) Limestone, medium gray weathering, 1' to 2' beds, bands of brown silica, fossil hash, conglomerate, chert pebbles up to 1" diameter ----- 24'.

2) Limestone, medium gray, lenses of shell hash up to 6' thick, silicified nodules common.

Collection 7-2[-A] -- 3' up.

Becomes interbedded with blue-gray calcarenite upwards - Collection 7-2-B --31' up.

Shale breaks at 35' and 40'. Total ----- 53'.

3) Shale, siliceous with chert bands, and thin limestone calcarenite ----- 8'.

PG. 70

4) Calcirudite, brown weathering, 6" cobbles in 4' beds and shale, siliceous, red-brown in 6' beds calcarudite has abundant silicified corals ----- 27'.



5) Calcarenite, gray, 1' grading up into quartz ss. ----- 12'.

6) Calcarenite, medium to dark gray, 1' beds,  
Collection 7-6A -- 1' up?

A few pebbles - calcarenites have siliceous through the pores - gets brown weathering color. Upper part of a conglomerate - dolomite also in patches. (Cephalopods and bryozoans to the west).----- 18'.

7) Sandstone, red-brown weathering, and conglomerate, chert pebbles in a dolostone and siliceous matrix, 4 repetitions.  
-----30'.

PG. 71

8) Limestone, brown weathering, shell hash, some beds conglomeratic, siliceous deposits in voids, 1' to 2' beds -  
-----40' (to top of knoll).

To the west these beds change facies into orthoquartzites, siliceous shales, to a large extent.

Above, beds which I think are the same as unit 8, there are:

9) Sandstone and shale, friable, yellow and red-brown weathering, some bands of dark brown siliceous shale ----- 30'.

10) Sandstone, light brown, orthoquartzite and thin beds of shales.  
(6° WNW dip).- -----15'.

11) Covered above, some beds are exposed but strikes are variable and apparently the sequence is broken by several faults.  
----- (King's est 525') mine —about 400'.

PG. 72

12) Shale, yellow-brown weathering, impart siliceous.  
----- 25' exposed.

13) Conglomerate, local lens. -----about 30'.

14) Ss., and shale, gray-yellow ----- 232'.

15) Limestone, yellow-gray weathering, finely laminated with some cherty bands, lenses of calcarenite -  
Collection 7-15A -- 5' up.

Collection 7-15B --12' up.

Collection 7-15C --17' up. -----Total 17'.

16) Shale, yellow-brown, thinly laminated, lenses of calcarenite with fossil hash - -----14'.

17) Limestone, medium gray, 1' massive beds, fossil hash calcarenite.  
Collection 7-17A 1' up. - -----2'.

18) Shales and ss., red-brown to yellow, thinly laminated, siliceous, one 6" calcilutite bed in middle. - -----10'.

PG. 73

19) Limestone, medium gray, conglomeratic in lower part, calcarenite higher -  
Collection 7-19A - 6" up.  
Collection 7-19B - 1.5' up ----- 2'.



20) S.s., brown to red-brown weathering, siliceous, thinly laminated, 1" beds, friable ----- 260'.

21) S.s., brown-red, cliff former, 6" to 3' beds, conglomeratic. ----- 60'.

22) Limestone, dark gray, conglomeratic ----- 2'.

23) Covered ----- 37'.

24) Limestone, light gray to chalky weathering, a series of ledges, fossil hash -- 35'.  
 [Fault N of Ss cuesta] (dip 6° to the ESE)

25) Calcarenite, light gray to brown weathering, 2" to 1' beds.  
 Collection 7-25A 6' up.  
 Collection 7-25B 10' up. Total ----- 12'.

PG. 74

26) Covered

27) S.s., dip 14° to the WNW, brown weathering, 1' to 3' beds, cross bedded locally, conglomerate in bands - 70' up a Cephalopod locality.  
 Collection 7-27A - ----110'.

28) Limestone, dark gray, 6" beds, calcarenite.  
 Coll. 7-28A --5' up.  
 Coll. 7-28B --12' up.  
 20' of light brown calcilutite  
 Coll. 7-28C dark gray limestone ---4' up.  
 12' of brown siliceous shale and siltstone  
 8' of limestone, black, Coll. 7-28D --6' up.  
 10' of siliceous shale.  
 4' of very fine grained calcarenite. Coll. 7-28E.

29) S.s., brown and siliceous shale ----- 62'.

30) Limestone, calcilutite, yellow-brown and siltstone alternating in cycles - chert nodules common in upper part - 175'.  
 -----more than 50' (up as far as we went).

31) Gray Capitan dolomite.  
 [Start Here]

PG. 75

7/28/59

Tried to chase down King's section up Little Blue Mt. - met a Mr. Mills who was of great -[help] [Mills is son-in-law of Ferguson and now, 7/59, is taking care of Little Blue Mtn. pasture.]

The fusulinids in King Sect. 17, p. 77 are mostly funny spots in the limestone but are not apparently fusulinids. His thicknesses here is about right.

PG. 76 Blank

PG. 77



7/29/59

Section 2A. Walker and Falk Ranches. Eastern Glass Mountains.

Covered below

1) Dolostone, brown to gray-brown weathering, 1' to 2' ledges, chert pebble lenses ----- 48'.

2) Limestone, medium gray, 6" to 1' beds, fossil hash, many fusulinid-bearing calcarenites:

Collection 2A-2A 24' up

Collection 2A-2B 26' up

Collection 2A-2C 31' up

Collection 2A-2D 43' up

Collection 2A-2E 48' up

Collection 2A-2F 62' up (platy in upper 20')

----- Total 67'.

3) Limestone, gray, 1-2' beds, abundant fusulinids, almost all limestone in total -

Collection 2A-3A 2' up - -----14'.

(--> King's base of the Word Ls. here)

4) Dolostone, probably like unit 3 below originally.

PG. 78

Sect. 2B - (on Fulk ranch here and higher)

4) Dolostone, gray-brown weathering, pitted surfaces (relic fusulinids), 1'-3' bed, a poorly silicified brachiopod bed about 25' up ----- Total 85'.

5) Dolostone, 1-3' beds, light gray in lower 200' becomes medium gray in upper part. ----- - est. 700'.

PG. 79-82

Blank

PG. 83

Salt River Section, Arizona

Collection 0 to 3 are in first road above Molasses-Redwall road cut. Collect 4 is in second road 10' above Collection 3, but the structure is a bit odd, is several NW plunging folds, slightly faulted? so that Collection 4 may possibly be same as Collection 0 (doubtful) because of lithologic dissimilarities however?

Collection 5 - Coral-Brach-Crinoid-Bry bioherm Prismopora and Fenestelloids.

PG. 84

Blank

PG. 85

Gap Tank area, Marathon/Glass Mountains, West Texas.

Stop 1.



Photog. April 16, 1964

Sect. 43, Bed 17 lenses into Sect. 40, from about bed 15-19.

43-16 looks to be about as thick as 43-14 as shown on section.

Distance between 43-15 and 43-13 is too great as shown on section

Stop 2. 39-1 is = 40-21; Lenox Hills conglomerate cut out limestone units 39-7 to 39-12 about 100 yards east of where Sect. 39 measured. "Stream channel" about 250 yards wide E-W.

Stop 3. 39-1 = [40-]38.21

{note: illustration followed along side}

and 38-4 = 39-7

37-9 = 38-24

and 37-9 = 36-6

38-21 = 37-5 and 37-6

PG. 86

4-19-64 A

Sunday April 19

Near Sect. 29

about 70-80' below 29-1 about 200 yards east of section 29 out on flats.

"Uddenites" zone of Keyes??

4-19-64B = 31-11

Ammonoid = 31-13

4-19-64C

4-19-64D = 31-13

Gray limestone conglomerate in flank of bioherm forming face of hill.

PG. 87

4-19-64π

Section 21 revisited

{note: illustration:

Bed 1: 31-11; algal mudstone

Bed 2: covered

Bed 3: 31-13; limestone congl, crossbedded

Bed 4: 5' covered

Bed 5: 7'. Fine ss., yellow, 6" beds, silty near top. Eolian?

Bed 6: 6". recrystallized algal limestone.

Bed 7: 18'. Mostly covered, some s.s., as below in lower 4'.

Bed 8: 2.5'.

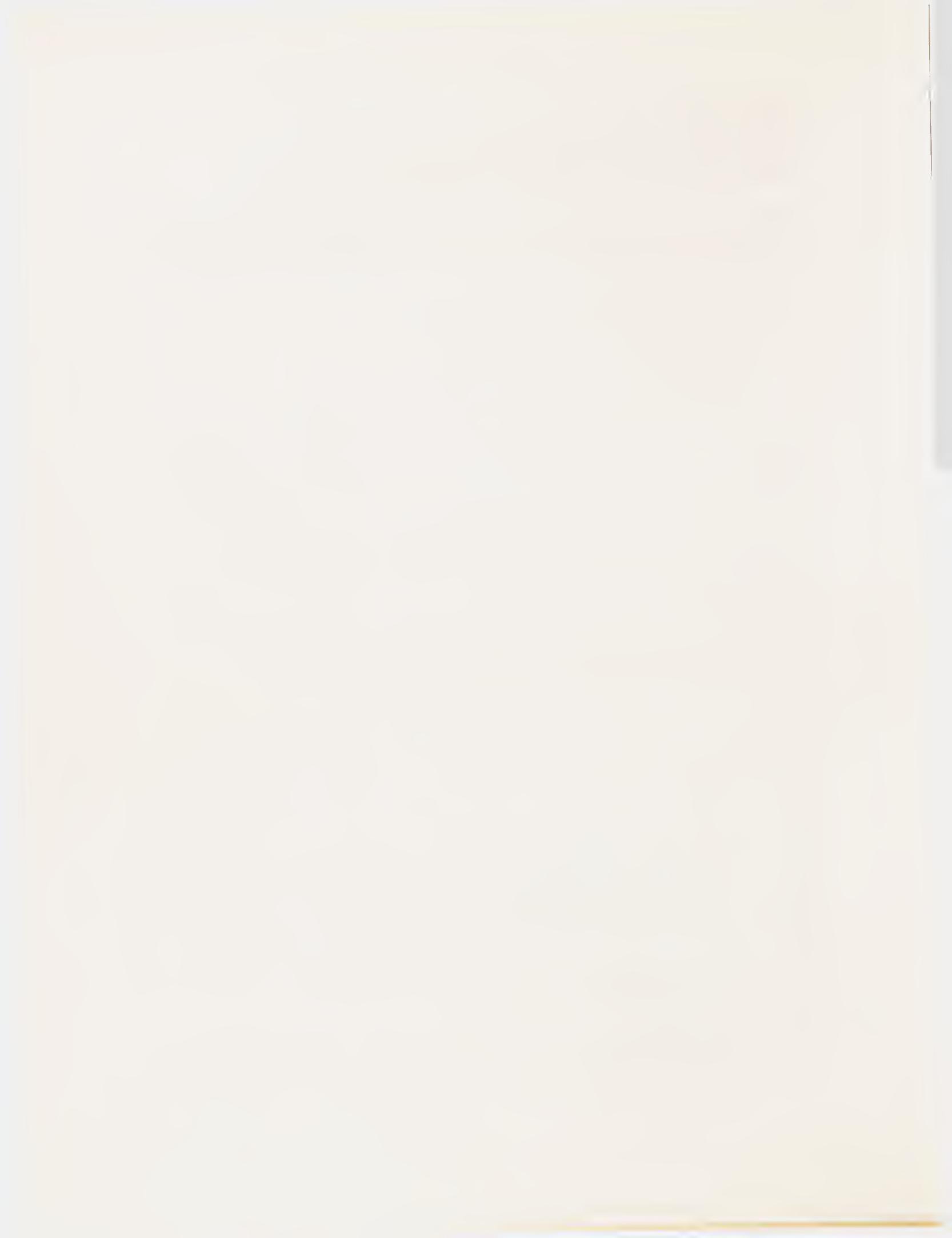
Bed 9: 5'. Algal limestone. Limestone congl. and calcarenite.

Bed 10: 7'. 2' reddish and s.s..

Bed 11: Coll. 4-19-64E, 4' up in red limestone.

Bed 12: Coll. 4-19-64F.

Beds 11+12 (14'; jumbled up like concrete mixer (=30-8) limestone mud - 2"- 2' beds mottled reds and brown).



Bed 13: 6', cover.

Bed 14: 5'; Limestone light gray, 2' beds, mudstone.

Bed 15. [Calcirudite] 25-40'.

{note:this section is illustrated on following page 87}

PG. 88

{note: illustration followed}

PG. 89-182

Blank

PG. 183

Decker and Merritt Okla Geol. Survey 1931, Bull 55.

Measured 1/4 mile west of US 77. Didn't find Bed 9. Sponge sect.

1) Bromide, Deckers Sect. 4, bed 16 calcarenite; buff weathering; rubbly.

Collection 4-16 Diplotrypa zone. (upper Tulip Ck poorly exposed - didn't fine Decker's bed). Seems to be all a "calc". SS.

2) McLish - Collection in Decker's Sect. 4, beds 72 and 73; rubbly limestone.

3) McLish - Collection in Decker's Sect. 4, beds 75/76, calcarenite, bry thin sect. here.

4) McLish - Collection in Decker's Sect. 4, bed 80; weathers buff; calcarenite; bry. colonies.

5) Oil Ck - Collection in Decker's Sect. 4, be 87 poorly exposed medium gray limestone; thin beds 2'-3'; very rubbly overlying more massive thin bedded units with few bryozoa and these in turn overlie a massive finely crystalline lightly gray limestone. Rhinidictyids with ramosc bry.

"Decker's section measured along edge of Ardmore - Davis Highway (US 77)

Dip 55° SW. Strike N60°W.

PG. 184

"Strat and Physical Char. of the Simpson Gp." C.A. Deckers and C.A. Merritt.



Doc. 318



doc 318  
0318

COLLECTIONS MADE BY CHARLES A. ROSS

The following collections were used in Charles A. Ross' 1965 Journal of Paleontology article "Late Pennsylvanian Fusulinidae from the Gaptank Formation, West Texas" vol. 39, p. 1151-1176.

Section 26, bed 2 (26-2)	30-3	31-3	32-1*
26-8	30-6	31-8	32-11 (2 bags)
26-10B	30-10	31-13	32-12
28-1*	30-19		32-16 (?3 bags)
			32-16 (=7-16-57-loc.7 (not 7-17-59-loc.7 & not 6753) (Leonard?)
*Not included in study - probably lacked fusulinids.			
34-15	36-4	37-1	
35-6	36-6	37-9 (8-20-57; 6683	
35-7	36-7	37-9 (float)	
35-10		37-11	
		37-12 6683	

The publication locates the collections quite well. These samples were retained by Charles Ross from the main smaples for future reference. They are part of YPM accession 6683

Charles Ross had a note to me that he was still tracking 37-36b which may be from the lower part of the Hess facies. He was also trying to locate the source of samples 8-31-66-J and 8-31-66-O and -Q; probably southeastern Arizona.

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C.A. + J.R.P. Ross

Summer 1959

Book 3

If found please return to

Peabody Museum, Yale University  
New Haven, Conn.

These are Leonard and  
Wood sections and  
samples

67551



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7/8/59

109

Brooks Ranch Section 2

1.) Shale, blue-gray,  $\frac{1}{4}$  -  $\frac{1}{2}$ " bands of brown siltstone — 10'

2.) Covered — 15'

— Top of Lenoxhills fm. — Base of Leonard —

3.) Limestone — light gray to light gray weathering  
3" to 2' beds, very fine fossil hash  
for most part — fossiliferous in  
thin beds within this unit.

Coll. 2-3A — 8' up

Coll. 2-3B — 22' up

Coll. 2-3C — 37' up

— shale interbeds gradually thicker  
to 6" or so — 48'

4.) Limestone, like below & Shale, light  
brown to light gray — ls. are 1 to  $1\frac{1}{2}$ ' thick, &  
shale beds are  $1\frac{1}{2}$  to 3' thick — 27'

5.) Limestone, light gray, very fine-grained, clayey  
& silty — 3" - 2' beds —  
light brown  
1 to  $1\frac{1}{2}$ '

2-5A — 12'

2-5B — 35'



7/9/59

2-5C - 52' up  
— 95'

6) Dolostone, light brown weathering and  
shale (covered mostly) - light brown-gray  
v.f. lsuantop 1 to 3' beds -  
Coll. 2-6A - 33' up

Coll. 2-6B: 85' up  
— 112'

7.) Limestone, light gray - 3' to 6' beds,  
few thin shale interbeds  
2-7 — 32'

8.) Limestone, light orange-brown weathering,  
v.f. gray. - 3 to 5' thick - separated by  
2-7' shaly intervals

the ls have a "Staffella" fauna, and  
locally scattered "Fusulimids"

— 90'

Cyclathems - 10-12 - get progressively  
more shaly toward top of unit

9.) Limestone, orange-brown weathering 1" to 4"  
beds. Orygialathes in top section

near base - dolomitic lithology

2-9A - 42' up

(Top ridge 146')

2-9B - 145' up

limestone becomes progressively more  
shaly and changes to light gray weathering

2-9C - 160' up

2-9D - 185' up  
— 215'

10.) Limestone, <sup>Dolostone</sup> orange-brown weathering, -  
very shaly - 2" to 6" beds - shale interbeds  
v.g. 1" Coll. 2-10A - 5'

Saddle 3D

2-10B. - 105' up

Rose colored beds 3' separated by 4'  
of orange weathering - silt-clay stone  
Cyclic beds becoming more

dolo 1-6 to  
silt-sand  
silt-clay

green - shaly (1)



fracture - on rare - recrystallized when found.

Gastropods - brachiopods - & ostracodes.

Conularia do 3

— 187'

11) Shale, light gray, & ls., light gray

— ls. — 2-5' beds

Coll. —  $\frac{1}{2}$  to 1' beds

2-11A 5' up

33-30' Calcarenous & ls. - ocellular  
concretions (15 in, max. 11 $\frac{1}{2}$  ft.)  
— 89'

12) Limestone conglomerate, well sorted

— 25'

13) Sandstone, light brown, sub-jud

Crinoids & brachiopods

well sorted, fine grained - grade

vertically in the calcarenous

Coll. 2-13A - 32'

to saddle

— 158'

14) Dolostone - brown-gray, porous, saccoidal,  
weathered to pitted surface - 3-6' foot  
beds. — 10'

15) Limestone, light gray, 6" to 2' beds -  
little weathering, dolomite or siltstone.

2-15A — 42' up

2-15B — 65' up

— 205'

Several different limestones in this  
unit - all are ls. size or dolomitic limestone.  
The more durable beds are white, size one  
are brown-gray. 4 to 5 alternation of  
grain size

16) Limestone, orange brown weathering,  
[relief outlines of sandbands (abundant) &  
5' at base] 6' —  
like 15 below

Coll. 2-16A 53'

[at 65' a mottled gray ls. bed w/ sand  
fragments]

[at 97' - silty bed 1', brown-orange;  
brachiopods 1].

Coll. 2-16 B. 185'

— 197'



17.) Sandstone, orange-brown weathering,  
very silty, calcareous cement  
3" to 1' beds

30' - shell bed - recrystallized, no fossils  
but thin crinoid columns,  
42'

18.) Limestone, gray-brown weathering,  
1" to 3' beds, poth marked  
silt + s. calcareous for most part  
[22' recrystallized pebbles abundant]  
[154' a 3' cobble bed, including  
quartz, garnetite, chalcedony pebbles  
to 1" diameter.]

Afternoon looked at the rest of the  
Leonard fm., lower part of Wood fm.  
There isn't much difference between  
the Hess facies and these upper  
units this far east. King's Sect.  
about 2 miles east is supposed to  
be quite markedly different in the  
2 facies of the Leonard fm., but I  
can't say that is true here.

From the top of these hills one can see  
beds in the Leonard fm. thicker + thinner  
within short distances. The units  
of brown-gray dolomitic ls. may change  
from 120' to 0' thick - 300 yards.  
Here there seem to be few "key horizons"  
in this interval - we have 3 or 4  
short pebble conglomerate zones near the top  
of the Leonard, a couple of conglomerates in  
the Hess facies - and that is about all.  
Even these are probably not of to great a  
regional significance as they are mostly  
3 to 6" cobbler lenses (near the top of the fm.),  
and the ones lower are calcerudites with  
locally derived pebbles + cobbles of limestone.

(short frag scattered throughout upper 150' 7/10/59  
18' out [pebble bed at 190' - 3" pebbles and  
— 293'

19.) Limestone-dolomite, light gray to light  
brown weathering,  $\frac{1}{16}$  -  $\frac{1}{8}$ " laminae  
of ls alternating with dolomite - 2'



20.) Dolostone, light brown  
pitted surface - 15'

21.) like 19 - 8'

22.) like 20 -  
[20-28' up - quartz frag. congl.  
fin. pebbles]  
— 74'

23.) Limestone, light gray, with  
some 18" bands of irregular lenses of  
dolomite, 6" to 1" beds -

Top of ridge (Fault ranch)

Locally angular ls. pebbles + cobbles make  
6" beds  
— 29'

24.) Dolostone, brown, with light blue  
outline, in 6" to 2' beds  
pebble congl. 6' up 3" band  
— 37'

25.) Limestone, brown-gray, shelly,  
Coll. 2-25 A - 5' up

Coll. 2-25 B - 24' up - 3" bed  
quartzined congl.

[Private collection]

— 42'  
26.) Limestone, light gray, poorly bedded  
2' to 3' beds, weathered crumbly -  
[65' - crinoid columnal bank - 20]

[Local intraformational congl. -]  
ls. pebbles

— 165'  
— 185'

27.) Sandstone, brown, red, orange,  
lf. quartz sand - 5'

28.) Limestone, blue to purple gray, irregular  
wave bedding, 42'

29.) Limestone, light gray, massive 2'-5'  
beds, excellent articulated fauna of  
Gastropods, Brachiopods, Pelecypods.

— 12'



7/10/59.

30) Limestone, light gray to white,  
fossils replaced by Calcite, 4 to 6' bed  
30' (K?)

Allison Ranch, Section 1

Covered below on this side of road -

1.) Limestone - brown, silty & sandy, 3" to 1'  
beds - 4'

2) Sandstone, creamy lime cement, X bedded  
3'

3) Limestone, dark brown-gray, - 3'  
black, dense -

4.) Covered — shale & marl ls. 18'

5.) Limestone, like ①, silified fossils  
8'

6) Covered — 7'

7.) Limestone, like ① and shale  
above it, coll. 1-7 5'

8) Limestone, like ① - gastropods - 1'

9) Covered — 8'

base →  
top #9

57'



10.) limestone, gray-brown, 2" to 6" bedding;  
 3', 6" of rubble beneath —  
 Coll. 1-10. fossilized corals — 4'

11.) limestone — yellow-brown, vertical  
 fractures — rubbly weathering,  
 Coll. 1-11. — 5'

12.) Covered — 8'

13.) ls., brown, fossil beds  
 brachiopods + *Onycholotrachelus* <sup>trochus</sup> *gaster* — 1'

14.) Covered — shale? — 4'  
 Coll. 1-14

15.) ls., like 10 — 10

16.) Covered — 3'

17.) ls. — like 10 — 2'

18.) Covered — 4'

19.) Shell hash — everything  
 — *Gastropoda*, *echinoids* — 6"

20.) Covered — 10'

21.) ls., yellow-brown, fine-grained  
~~calcareous~~ — 2'

Coll. 1-21 —

22.) ls., light yellow-gray, sandy — 5'  
 3" to 6" beds

23.) Covered — 29'

24.) ls. — dark gray, 6" bedding —  
 recrystallized fossils — 8'

25.) Covered — 12'

26.) ls., yellow-brown weathering + fresh,  
 graphic *reticulation* — part — 31

27.) Covered — 15'

28.) ls. — gray-brown, 1' to 2' beds —  
 fine shell hash — 10'

base →  
 top #19  
 90' 6"

base →  
 top #28  
 184' 6"



29) Covered — 37'

30) Ls., light brown, indistinct laminations,  
6" to 1' beds — 7'

31) Covered — 13'

32.) Ls., light yellow-brown, — 4'

33) Covered — 11'

34.) Ls., med. gray-brown, 3" beds — 3'

35.) Covered — probably more shaly  
interval of 34 — 12'

36.) Ls., orange-brown, 6" beds,  
silty + sand (U.F.g.) — 8'

37.) Ss., white to very light gray, Xbedded,  
— 15'

38.) Ls., yellow-brown, very sandy,  
massive — 3'

base →  
top #38

297' 6"

39) Covered, — 8'

40.) Ls., brown-gray — 3" beds,  
recrystallized fossils — 2'

41.) Covered — 7'

42.) Ls., med gray-brown, 6" beds  
small fusulines? cut. #42 3'

43.) Covered — 4'

44.) Ls., light brown-gray, silty,  
recrystallized fossils, several shale  
beds 6", bed 6" — 12'

base →  
top #45  
344' 6"

45) Covered — 11'

Total 356'

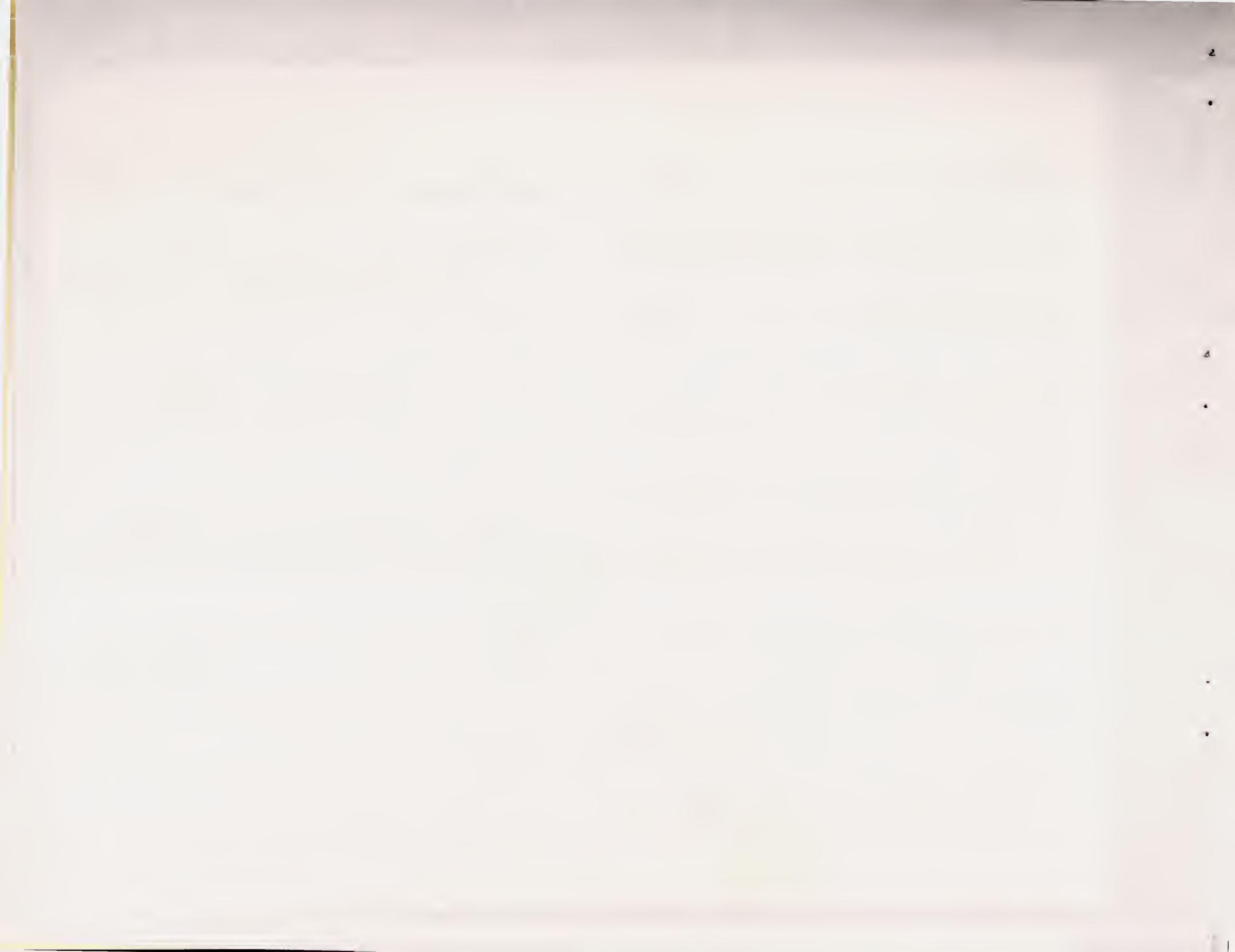
46. Ls., light gray, fine grained, dense,  
— 21'

47. Covered — 4'

48. Ls. like 46

49. Covered

6'



50) ls, like 46, — 1"

51) Covered — 2'

52) ls, orange-brown, silty, shell  
lach, —

53) Covered — 22'

54) ls - brown-orange, sandy-silty  
silt, 6" beds; a few shell  
4 to 6" beds — 24'

55) ls, fine-lined ~~cochina~~, gray-brown,  
6" beds  
Call. 1-55 — 2

56) Covered — 9'

57) ls, dark gray - shell lach — 6"

58) Covered — 8'

59) ls, lith 57. — 7'

60) ls, orange-brown, sandy-silty,  
2"

61) Covered — 3'

62) ls, gray-brown, sandy-silty  
shell lach, — 6" beds — 11'

63) Limestone, brown to yellow  
weathering, partly covered, — 17'

64) Sandstone + salt stone — 21'

65) Limestone, light brown-yellow,  
1" beds — 31'

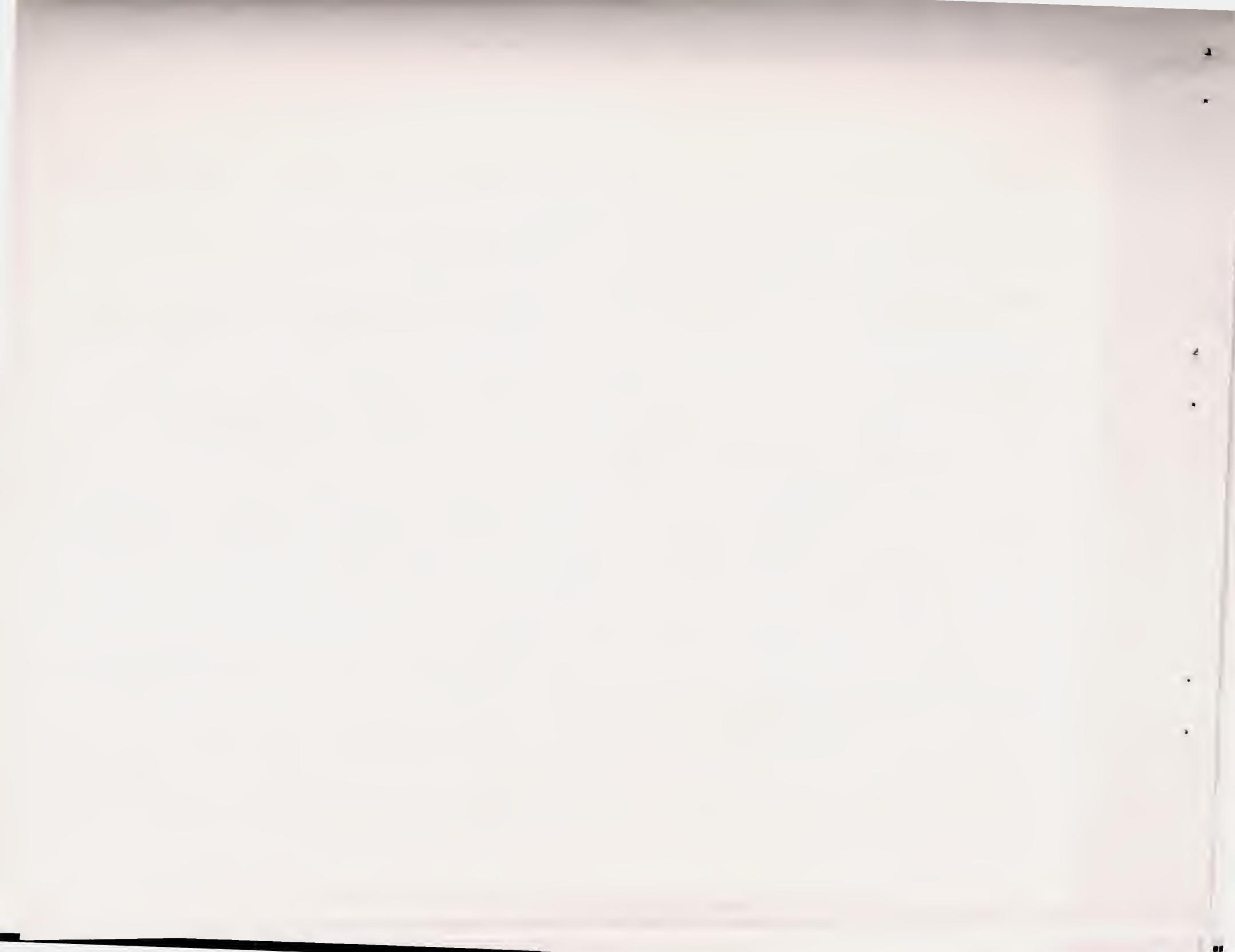
66) Covered — 37'

67) Ss., purplish-gray weathering, — 2'

68) ls, gray-brown, shell lach,  
3" beds — Call. 1-68 — 61'

Total 160

69) Ss., orange-yellow weathering, 1" beds,  
3"



70.) Covered — 10'

71.) Ss., like 69 — 91

72.) Shale, gray in 5-15' bed, alternating with ss. in 6" beds — 53'

73.) Ss., like 69 — 3'

74.) Shale, gray; grabb ss. (white + purple) + 6" ledges of resistant ss. — 38"

75.) Ss. like 69 —  $3\frac{1}{2}$

76.) Covered for most part —, some purple-brown ls. with large calcareous shells, + ss. — 22'

77.) Ss. like 69 —  $2\frac{1}{2}$ ' —

78.) Sh. + Ss. (orange) — 22'

79.) Ss., gray to brown, X bedded, — 6'

80.) Ss., orange-brown, like 69. — 12'  
Total 184

81.) Ls., light to mid. gray, chert frags. common, 2' to 3' beds  
[27' of a orange-brown weathering ls. 15'] — 45'

82.) Ss. — light brown — grades vertically into sandy finegrained ls.  
III 2'  
13' — 15'

83.) like 82 — 17'

84.) like 82 — prove connection at top — Coll. 1-84 — 12'

85.) Ls., gray-brown, 6" to 2' beds fossil shales — 25

86.) like 82 — 12'  
ls. has algal plates



87.) ls., blue-gray, 3" to 6" beds,  
fine shell hash, recrystallized  
fusulines in a few beds. — 35'

88.) Covered — over two thin  
ls. ledges — 22'

89.) ls., mid-gray, monstons  
- nodules common, 6" to 2'  
beds, fossils recrystallized  
Total 92' — 35'

90.) Shale and ss. — 7 to 10' bed  
alternating with ls., dark gray,  
Total 150 yds. — 52'

91.) Covered — 11'

92.) ls., mid-gray, brown "tubes"  
on matthid surface  $\frac{1}{2}$ ' —  $\frac{1}{2}$ '

93.) Covered for most part, ss. orange,  
limpet purple +, silty, yellow  
outcrop patches — 32'

Total 95  $\frac{1}{2}$ ' —

94.) Limestone, <sup>and</sup> gray, 2" to 2' beds  
with some colored intervals — 34'  
calcite shells - replaced fossils?

95.) Covered — 7'

96.) ls., mottled gray + orange-brown weathering  
3" to 6" beds — 10'

97.) Covered — 28'

98.) ls. mid-gray, silty + sandy — 2'

99.) largely covered, probably siltstone, also  
every 4 to 10 a 6" ss (orange-brown) cuspate —  
48'

100.) ls., light-gray, very silty, sandy, clayey,  
peridot bed. — 2'

101.) Shale, largely covered, + ss. —  
2 beds, orange-brown — 8'

102.) Covered, except for 3 6" beds of ss. — 31'

103.) ss., orange-brown, lignaceous,  
massive — 2'

1

Total 122'



7/12/59.

### Section 3

Western Brooks Ranch  
recovered King's bed 26

the beds

9.) = *S. costatostriatus* zone  
with *S. costatostriatus* block  
3-(9) A first appearance at  
3-(9) B - 35' up <sup>base of bed</sup>

- 108'

10.)

Coll. 3-(10) A - 5' up

- 270'

11.) Double ledge

3-(11) A - 2' up

12.) Coll. 3-12 X - 26' up 10' up  
Coll. 3-12 A - 35' up

13.) 2nd ledge 3-13 A 30' up

14.) 3-14 A - lower ls. ledge  
3-14 B - top of unit

3-14 C - algal bed -

Strophes are common throughout  
the lower beds - (9) through (12)

16.) 3-16 - 15' up

3-16 B - 35' up

17.) 3-(17)

3-17 B - in section, 50' up

Base of King's fossil bed is a  
conglomerate  $\delta$

In 3-17 B fusulines occur with  
genaria, Camarotoechid, Onychites  
trilobites.

3-18 A - <sup>flat</sup> We find King fusulines  
are found ls. with algal coatings.

3-18 B - 35' up



Most of bed 18 or in the  
base of bed 19 - red silicic  
shale & siltstone - 10' ± thick

The lower part of bed 19's section  
was much easier to follow than  
the upper part. This might be in  
part the result of the topography  
for beds 14 and higher are exposed  
on the top of the escarpment. How-  
ever, the section seems to be a change  
in lithology at the interval of  
the Ness fossil bed. I just  
above & below - There although  
we tried to follow the route of  
the measured section it is  
possible we missed it in the  
upper units.

The fossil bed is a pulpy  
iron sulfide here and is not the  
resistant to cliff formation as to  
the next. Fuculimids really  
make up a lot of this interval  
above & below the Ness fossil bed.

7/14/59

With Cooper, Grant,  
Shinner & Wilde,  
and Stellini

Collected from Ness ranch house and  
from the road about 1 mile NW of Hill  
5779 north of Leonard, Alt.

Word 1. 15. - 35' - 3 coll.

Word 1<sup>st</sup> shale coll. 5-2A word - 35'  
" " " 5-2B - 45'  
" " " 5-2C - 65'

do. become more abundant and the  
upper 50' are 2' to 3' ls. beds -  
Total from top 1<sup>st</sup> ls. 80'

Shale, silicic with 2' ls. beds -  
- coll. 5-3A - 15' up  
- coll. 5-3B - 20' up  
- total 140'

Word 18. - position 2<sup>nd</sup> ls -  
coll. 5-4 - 7'

Shale 155'

Word - 1' fuculim. - 5-5A -  
(10') 5-5B - 5' up



Shale - 20'

ls. - 2' Coll. 5-6A.

Shale - 20'

→ ls. - base 3<sup>rd</sup> Word ls - Type Paraf  
stelliferi Coll. 5-7A

3'

→ Shale - 121

→ cephalopod zone - 2' ls at base of next

ls. - and gray 3<sup>rd</sup> Word ls

no fossils - 65'

The first Word ls is thinning to the NW - mainly at the top of interfingering with siliceous shale - The ls. just below Word 2? are fine grained lenticles, and a few 6" limestone are rare (2 or 3) between 2nd Word. and 3rd ls.

Cooper pointed out a high Leonard ls. locality just N of the road up Chickasaw Canyon at the base of the Word fo.

It seems that Cooper's "Hess Ledge" can be traced around the end of the ridge behind the Hess ranch house and behind the house to a point opposite the gap between the hills in the front. He doesn't find this fauna on the front of the ls. escarpment to the south (Hess escarpment) because in his words "it isn't the right lithology". Thus he would rule out the idea that this fauna occurs in several horizons.

Wilde is using the 1<sup>st</sup> Leonard ls. of King as equal to the Hess fossil bed. This seems to solve a few problems - but I wonder how many?

The section we measured in the Word seems to best fit in with King Sect. 18, p. 70, but this on depositional strike  $2\frac{1}{2}$  miles to the NE.



• 7/15/59

### Split Tank

Coll. 3-(19) from upper ls in these facies - most of this is a crinoid packstone - 15' below top.

(maybe in lower ls. of Leonard)

Coll. 3-(2) Leonard - [3-13]

The upper beds of Leonard (2)  
have abundant fusulines.

### Road to Red Tank

Word 1st ls. - has ls. cobbles in  
the upper unit. overlain by 15-20'  
of siliceous shale followed by  
dolomite #2 ls.  
→ Coll. from float near top of  
1st ls.

→ Coll. - 4-5' above Word  
ls. #2

The 4th Word ls. and the Vidrio  
are dolostone facies for most part here.  
They like the upper 250' of these facies.  
Locally they have abundant relict  
outlines of fusulines but we couldn't  
find any that were well preserved.

The Split tank Leonard section is  
faulted in several places and we  
were able to follow King's section  
in only a general way. Cooper  
said each ls. was a lens which  
pinches out within a short distance  
and each of these apparently contains  
a distinct blacktop assemblage.



Hesse Ranch - 7/16/59 -

✓  
Loc. 2 Word ls.; 2<sup>nd</sup> limestone by the road  
north of the house - This is  
apparently 2<sup>nd</sup> or 3<sup>rd</sup> ls. - in the field  
I judge it to be the 2<sup>nd</sup> ls. - or #1

Loc. 3 Word 4 ls. - A - 12' upon ledge  
probably #3 3/4 mile up valley B - 10' " " "  
from earlier tank

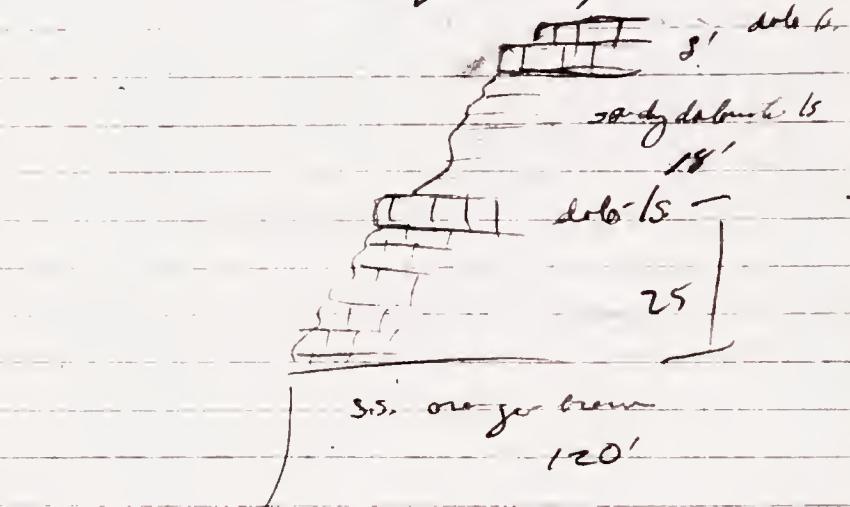
This is not too close to the massive  
beds at the top of the ridge - which  
bring down Vidrio - way 125' to 150'  
below the Vidrio

The sequence is a silty, dirty limestone  
in 2" to 6" beds with a few scattered  
fusulimids in some of the more undulated  
beds - 135' of these up to 4<sup>th</sup> ls.

See Calcareous for Word 4-Vidrio  
Sect. 1

Road Canyon, East end -

✓ → meager coll. from word 3<sup>rd</sup> ls  
35' (A)





7/17/59

There is a fault cutting the SE face of section at Road Canyon - also several Terra Blocks have dropped down.

The Word 4 ls lenses are just about gone here with the Viduodale lying conformable but with an abrupt lithologic change.

Sect. 5 Leonard Mts -

0) - (see ~~next~~ page over)

Covered below - mainly dolomite and ls. interfingerings in tongues + patches

1) ls., med. to dark gray in fresh surfaces, massive 10 to 20' beds, Saccinctella zone of G.A.C., weathers to rounded surfaces, one 5-6' zone of shaly 1" to 1.5' beds 65"  $\overline{112}$ '

2) ls., dark gray, 1 to 2 foot beds, crinoid and bryozoan fragments - 43'

3) ls., med to dark gray, 6" to 2' beds, Cape ridge, a few jets, angular weathering, - conglomerate locally - 37'  $\overline{\text{Coll. 5-3 demand}}$

4) ls., dark gray, 3" to 1' beds - 12'

5) Calcinedite, 4" cobble, with 4" of dark gray ls. in molds  $\overline{34}$ " top of ridge

Coll. 5-5 lies at and hill top ridge

6) ls., light gray, shell bed, scirripin part - 31'

Wild's locality - coll. 5-2 gully probably about bed?



7.) Covered in part, thin ls. (dark gray) - siliceous shale — Kew fault zone - but no fault here  
silty ls. + shaly ls. in part — 18'

8.) Calcareous, light gray, massive, 2-5' beds, 16'

9.) Calcareous, dark gray ls. matrix, 6" bed 21'

10.) ls., light gray, 2' beds, (Calcareous), one brown bed (Cal. 5-10 hand) 5" up — 20'

11.) Calcareous, dark gray matrix — 12 3" cobble

12.) ls., 2" crinoid calcarous bed, light gray, 5-6' beds — shell bank - arenite, 5-12A — 3" up.  
5-12B — 8" up 38'

13.) Calcareous, dark gray ls. matrix, 2" cobble 6'

14.) Calcareous, light gray grading vertically into shell bank — several of these cycles repeated — (3) — 37'

15.) Shale, siliceous, red/orange — 33'

16.) Congl., ls. matrix + few cobble, chert fragments — 2' → 6'-7' to So. East 10' 2'

17.) Shale, orange - siliceous, platy. 32'

18.) ls., light gray, massive, subf. <sup>crypto.</sup> fossils, chert frags <sub>near top</sub> 56'

19.) Shale, orange-brown, with 1"-2" ls. beds (carbonaceous chert pithos) — 67' siliceous carbon

20.) ls., light brown-gray, 2'-3' beds siliceous bands 17'



21.) Shale, orange-brown, silty - 2'

20.) base of Hess ledge rest unconformably  
on truncated edgey Lemoorels few.  
3' rubig, 5° different Lemoorels dysomia  
col 0-A 10' below unconformably  
0-B 1" "  
0-C 1' above in Hess ledge

21.) Shale - orange-brown - silty -  
top 6" bed of sandy ls. - 47'

22.) Shale, orangewhitey (bleached)  
with 1"-3" shell hash band  
- 55'

23.) Covered - 115'

24.) Shale + siltstone - orange - 25'

25.) ls., th, shell, orange + black - 6'

26.) Siltstone, yellow-orange - becoming  
near top *Amicticula* - 24'

27.) Covered, mostly gray shale - 87'

28.) Congl., chert frage, brown weathering,  
many large & black silified - 8 1/2'

29.) Covered, mostly gray shale and a few  
6" white + ss (orange) bed - shell hash - 14'

30.) S.s. - orange-brown - Beach shell  
hash - Col. 5-30 ls. at 12'

31.) Covered - 86'

32.) Wind ls. - 100' +  
here it is a ss. at the base - 2-3' beds  
orange to brown gray - 25' above  
have gotten massive calcareous -



7/18/59 - outcrop -

Can. G.A. Cong. & Diab. grad. in ls...

7/19/59 Section 4

1) Silt -

20'

2) Shale, brown, with thin clay rich dolomitic ls. — 72'  
Coll. 4-2 — 6' down front of

3) ls, brown-gray weathering with large calc. crystals — 4'

4) Sh, brown, + thin ls.

4-4A - 3' up

4-4B - 11' up

— 23'

5) ls, brown-gray — 2' beds, calcite shals in long "bodies" — 13'  
→ top of Glenoshville fm. ←  
commonly found with 5 to 8' relief  
— 200 yds —

6) ls, med to dark gray, calcareous, many marble ls — 2 to 4' beds.  
Coll. 4-6A 8' up

and shaly ls. —

— 15' up (4-6B)

4-6C — 23'

4-6C — 11'

11'

2 cycles of ls. 6' to 8' + shale 18'-25'  
52'

7) ls, light gray, with brown-orange chert concretions — massive  
Coll. 4-7A — 16'

8) Sh. + ls., brown + light brown weathering —  
[Varicolored shales + white ss. 25' up] — 32'

9) ls, brown-gray 4" to 3' bed — mostly  
zone 1' at base  
small recrystallized staph. area  
common throughout — 17'

10) Shale + shaly ls —  
6" bed of white ss. — 12'

11) ls. like 9 — 10'



12) ls., gray, 1"-2' beds, vertical fractures  
on weathering.

Coll. 4-12A - 3' up

4-12B - 12' up

problematic fossil 4-12C - 22' up

4-12D - 32' up

top of bench

13) ls., dark gray, calcarenous, 6" to 1' bed

Coll. 4-13A - 20' up

Follows - Neal fence here up - 23'

14) ls. shale, brown grades upward into  
clayey ls. + finally into a calcarenous  
at top

Coll. 4-14 at top - 27'

15) ls., light to mid. gray, 6" to 1' bed

Coll. 4-15A - 12' up

Coll. 4-15B - 50' up

- Shaly beds commonly reach 10-15'  
in this unit

4-15C - 78' up

- 106'

16) ls., mid gray, little shale, 6" to 2' beds,  
rubby in part -

Coll. 4-16A - 3' up

Coll. 4-16B - 26' up

several beds of dolostone common

st. calcarenous - becomes dark

gray above 30' ; light gray above 42'

Coll. 4-16C - 43' up

Coll. 4-16D - 58' up

- 59'

17) ls., light gray, silty, 3" to 1' beds

rubby - with thin shale bands -

small "Staphelia" fossilines common in  
all beds -

- above 33' dark gray

- small, subcylindrical fossil is replaced  
by dolomite (47') - 521

18) Dolostone, brown-gray + ls., gray-brown

4-18A - 11' up

- 27'

19) ls., light gray, 2-4' beds, silty, clayey, - 37'



20.) Ls., med gray to light gray, thin bedding  
2" to 6" and shale & dolomite.  
dolomitic; —

Coll. 4-20A - a 2' calcomite 26' up  
— 37'

21.) Ls., light gray to cream, massive 3 to  
5' beds with thin bedded and gray  
sh. —

rubby bed Coll. 4-21A — 30' up  
rubby bed Coll. 4-21B — 35' up  
massive bed Coll. 4-21C — 42' up  
— 54'

22.) Ls., light gray, 2" to 4" bedd, fossils  
are common but dolomitized —

82'

23.) Ls., light gray - massive 2' beds,  
Coll. 4-23A - 17' up

4-23B - 29' up  
— 34'

24.) Ls., light gray to cream, thin irregular beds,  
2" to 4" beds - laminated,  
pink tones about 65'-80'  
— 87'

25.) Ls., light brown gray, wavy bedding,  
in beds 2' to 3', massive, clayey &  
silty:

SEVERAL SMALL FAULTS

— 97'

26.) Ls., med. gray, 2' beds, with brown shale  
cycles of these, the shale gradually becoming  
dominant — 193

up to Ness - Neal Gate

This is very near the base of the Nessan  
Bed — delete



7/20/59

✓ 4-26 m - 1/2 mile east of section 4, 25' below fossil bed.

✓ 4-28 1/2 B - 1/2 mi. east of Sect 4, from a 35' to 40' light gray ls. above fossil bed. - 8' up

✓ 4-28 ma - 5' up

✓ 4-27 ma - fossil bed, silicified sand above 2-3' ls. ledge 15' beneath top

✓ 4-28 mc - 35' above Fossil Bed

✓ 4-29 ma - massive ls about 25' above top 4-28 -

27.) Fossil bed,

a.) basal calcirudite 28'  
b.) Shale + ls., shale is brown; ls. is medium gray, abundant silicified fossils - brachiopods, coll. of trilobites, yellow - silt ls. 27'

28) ls., medium gray, 1-3' beds, dolomitic, Chert nodules,

Coll. # - 28A. - 42' up  
Unplanular corals

Coll. 4-28 B - 64' up  
top of hill - 89' - 115'

29) ls., bluish gray, 2-4' beds, with iron and blebs & chert pebbles - 24'

30.) Shaler + limestone, brown - silicified; dolomite or dolomitized ls. 2' beds - 29'

31.) Dolostone, dark gray - brown, 4' beds - 21'

32) ls., light gray with 'graphic' dol - 6' beds - 12'

33) ls., conglomerate (calcareous) with chert pebbles 3-4' beds - 91'



34) bed sh., siliceous - 25'

Chert nodules

35) Dolomite, thin-grained, grits - 250' <sup>est.</sup>

↑ start here

Coll 4 - Word 2 ls - 25' up

Word 2 ls - 50'

These are { Word 2c ls - 65' up (top)  
10-15' above the top of }  
the 2c ls { Word 2d ls - about same  
50', separated from 2c -  
Word 2d ls from saddle

Word 2E - 25' above 2d  
35' below first massive  
limestone in 3rd Word ls.

Word 3<sup>rd</sup> ls. A - 5' up

Word 3<sup>rd</sup> ls. B - 8' up

Word 3<sup>rd</sup> ls. C - 18' up <sup>35'</sup> total thick of ls.  
12' dolomite-top of ridge

Word 1<sup>st</sup> ls. - 20' below top of King's  
unit "a" Coll. 4 - Word 1a

The Word ls. contain a lot of conglomerate  
stages - sand pebbles + cobbles of ls.  
probably intraformational in part and  
from chert pebbles - where we saw the  
conglomerates, the basal ls. (#1a) is  
very little different from #1b although  
King's separation isn't bad. The  
distance between #1 & #2 is closer  
to 83' than 14' and I think these  
numbers are reversed on p. 143.

The distance between #2 & #3 is  
a little high - unit 6 becomes 15.  
and 5 has fossiliferous ls. layers  
in it.



Section 5 jail  
Canyon

7/21/59

The south side of Leonard is complicated by: a) facies changes

- b) irregular dolomiticating beds
- c) several faults

I have perhaps drawn the top of the Leonard a little high but will let it stand for the moment — Change in the Leonard for is thin here as an eroded anticline (pre-Leonard).

Jail Canyon where road is shown on map —

- 1) No Altuda shale on SW end of Hill 5789 — This is King's Capitan upper member —

2) Vidrio = Capitan upper member apparently + it seems likely that Altudash + lower member are equal to upper part of Vidrio

Section on East Side of Alt. Bluff Mts  
Jail Canyon

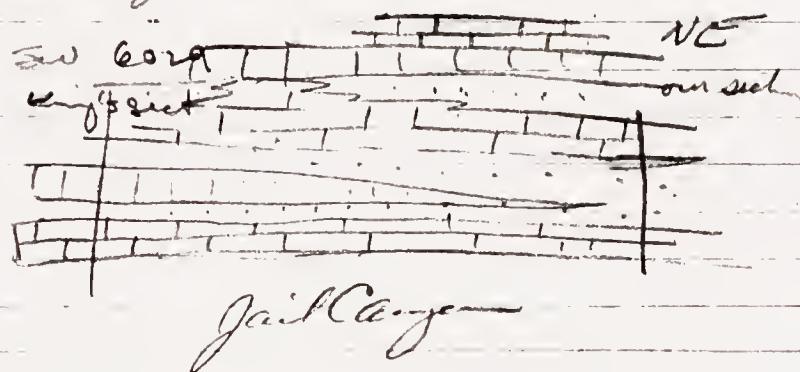
Covered below

- 1) ls, mid gray, 2-4' beds, gastrulae + crinoid columns, recrystallized, — 15'
- 2) ls, (buff) light brown weathering, 6"-1' beds, silicon bands — 85'
- 3) ls., mid gray, pitted weathering surface, 2-5' bed (similar to unit 1) — 51' lenses of calcarenous (Coll 3A)
- 4) S.s., orange-brown to light brown, weathering, 2" to 6' beds, silt of calcite cement, "silicon" bands are irregular throughout unit — 112'
- 5) ls., mid gray, calcarenous — 2-6' beds, silicified + replaced fossils — Jail Canyon — 5' — 3'  $\pm$  Congl. in part — sf. calcarenous to 1"-2" pebbles in caliche (See King's Sec. 16, unit 5) 20'  $\pm$
- 6) ls, tan, calcilutite + ss, pinched out to south — 10' 30-40' on ridge 400 yds N.



7.). ls., mud. gray, 2'-3' beds, to top  
of Hill.  $\uparrow$

His unit 3 is missing where we  
measured section but become thicker  
to SW — His units 3+2 = upper  
part of his unit 1



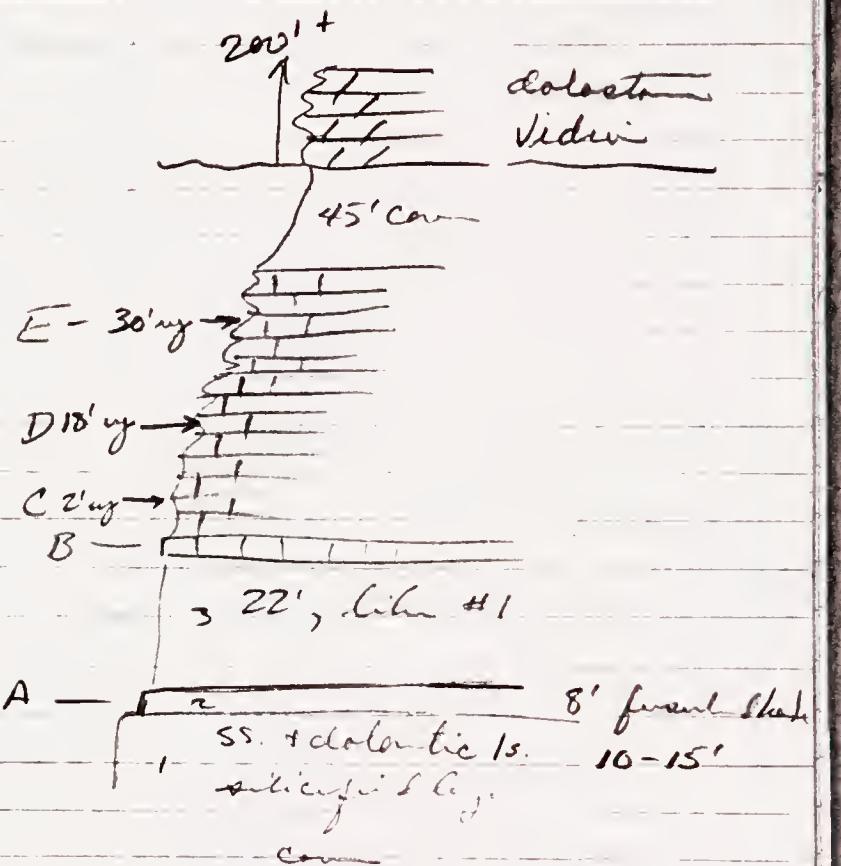
[3 3/4 miles N 30°W of Skinner Ranch]

The Word ls. which King mapped  
along the west side of Gillet and Canyon  
is probably his 3rd ls. not the first  
one. (Coel. Iron At. and Word ls. A)  
is from this — includes a few  
scattered fusulines, cephalopods and  
a "Scaphites" brachiopod. There  
seems to be no need for the  
fault further SW. The top of the  
hill here Clinton is a tuffa block

The Clinton Anticline projects out  
to the south of this point a bed  
again their 10° NW dip



Elbow in Hess Canyon - 7/16/59

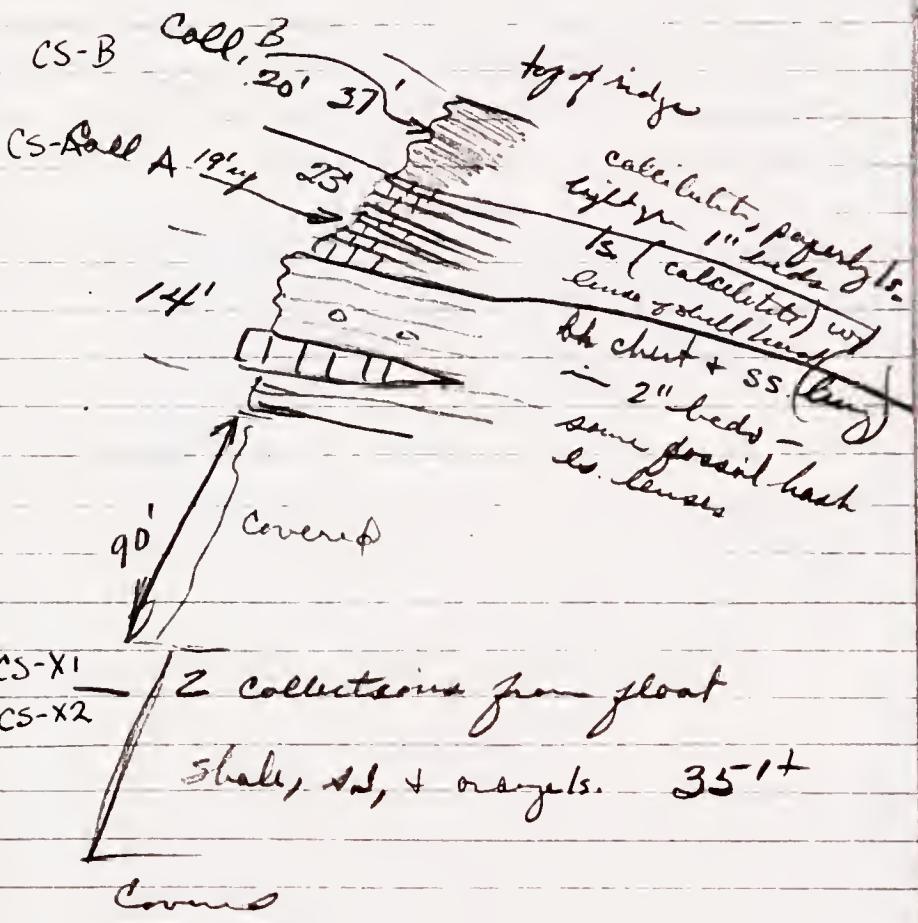


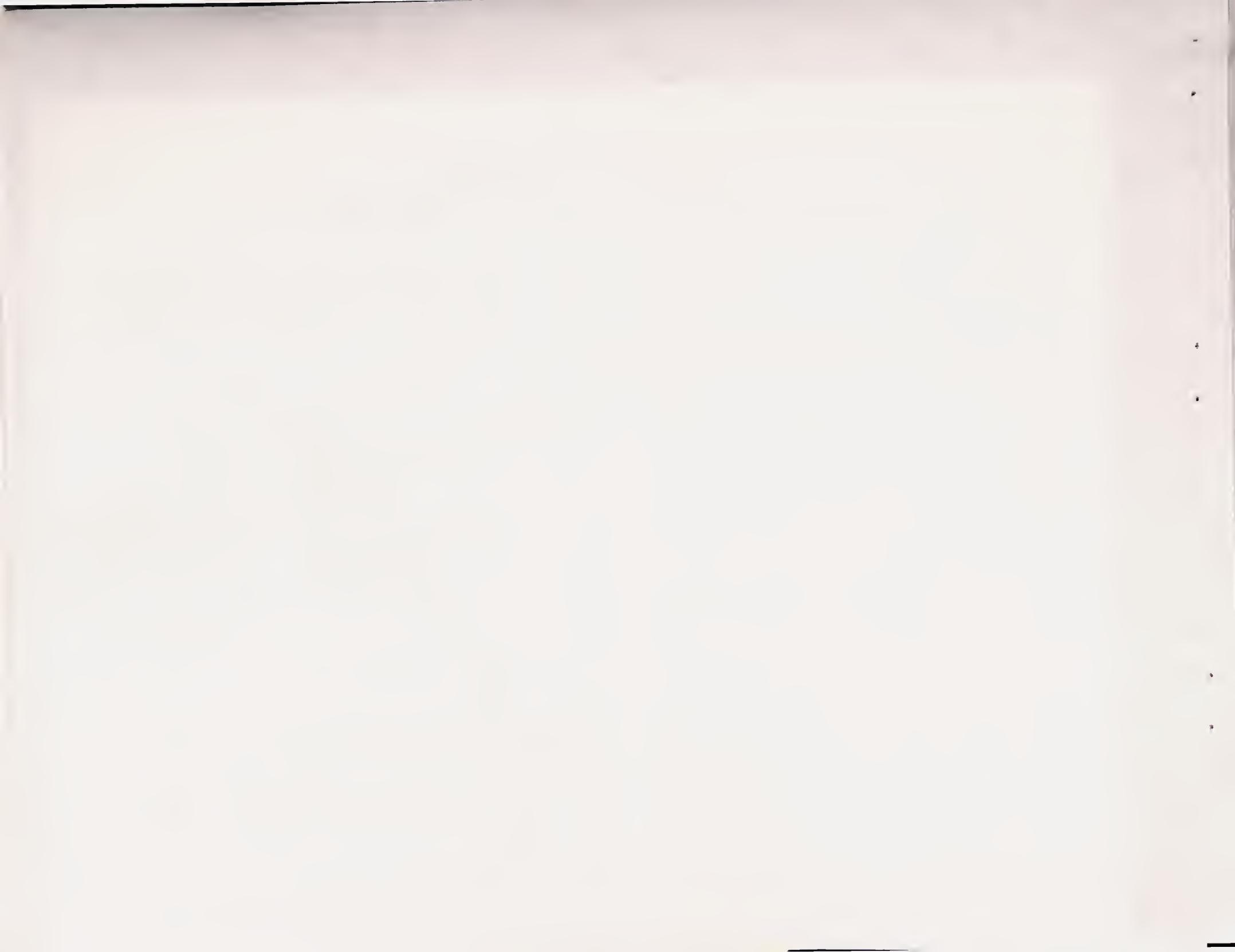


7/22/59

Clay Side -

The upper part of Leonard is badly covered by talus blocks from the Word D. above.





✓ Cla, H. S.

Accomoto Call.  $\frac{1}{2}$  mile SW of  
Kings Aycombe 12° along road.

Stiles Ranch Road & Clay  
16 miles

Slide cap - junction

3 collecte -

20 { ① Wood BC - in lower 20'  
gray limestone

25 { (2) Brown to yellow weathered bed

35' } (3) Woods D in lower part of  
maxine redbaled ls. 10' up

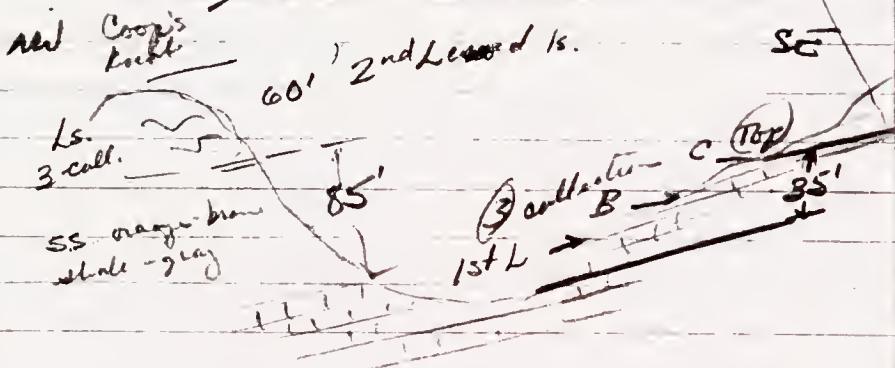
Ward 15.E, 6' below top ridge

7/23/59

Morning - climbed from the "Hes" ledge up to the 2<sup>nd</sup> Leonard Ls. - made three collections based on King's sect. 12

The base of the Capitan at Sullivan peak  
is a beautiful unconformity - 40' or  
more relief and parallel bedding.

Afternoon. - base of little knob of  
Cooper's Ferry and Texas Hills -  
base of little Shale + Siltstone + Sand  
at  $10^{\circ}$  to the SW



This sector is cut by a faint or faints and the exact relation of the hills is dubious - it is probably the 2nd terrace ls, but?



The Leonard fm. in the Denver bluffs consists of a series of 15 tongues which tend to become thinner to the S.W. and breaking into a mass of thin units by additional shale tongues. The structural problems are big especially in the area south of Sullivan Peak, between Dogout Mtn. and the Altadura mtn. Of course it is all covered but there is still a real problem to figure out.

Kings map is wonderful, but his isn't very consistent about his boundary between the Word and Capitan - his Leonard + Word also have problems - the ammonite bed which he places in the Leonard in the west is about the right tongue for his 1st Word limestone in the east. It seems the Word Leonard boundary is also inconsistent.

The base of the Word in the west seems to be about the 3rd ls. of the eastern Mts. In Section 12 this unit is greatly thickened and may represent the reg between

the back reg faces to the east & the base to the west.



7/24/59

Decie Ranch - Sullivan Park  
Coll. from lower 25' of limestone  
Worth of Kij's Sect. 12

Coll. " " B float 25' below top

Coll. " " C in place 20' " "

Coll. " " D " 10' " "

B+C+D are from Kij's bed 3

Kij's Ward bed 4 - couple - 3-4" ls  
cobbles from orange weathered  
bed and ls., some chert.

Coll - Kij 12 - abt 14

Coll. Kij's Sect 12, Ward bed 5  
12" up

Coll. f. Kij's Sect 12, bed 6 - 9038

Coll from float from Kij's bed 18, Sect 12

7/25/59 - IRON Mt. Ranch  
Section 5A

Covered below

1.) Siltstone and shale, with thin platy  
sandstone, yellow-brown weathering  
1/4"-1" beds — 58'

2) Carbonate, med gray weathering, fossiliferous  
1' ledge, Coll 5A-2 — 1'

3) ls., orange & gray weathering, fossil hash  
of brachiopods & fossiliferous — Coll 5A-3 - 1

4) Limestone, orange-brown weathering, sandy  
fossiliferous — Coll 5A-4 — 2'

5) Sandstone, yellow-brown weathering, lumpy  
1" to 6" beds — 27'

6) ls., med. gray, 1" to 2" beds, even bedding,  
Coll 5A-6A  
Coll. 5A-6X float — 2'

7) Siltstone and sandstone, yellow-brown  
with lumpy beds of sand. — 37



8) Ls., mud gray, massive beds in  
5 to 10' cliffs, thin irregular brown  
clay bands, — 56'

9) Siltstone + shale, covered for most part,  
yellow to light brown weathering, upper  
15' becomes a sandstone — 123'

10) Ls., mud gray; basal 2-3 a calcarenite,  
becomes fine grained upwards,  
fusulines common in a 6-12" band  
just above congers. Call 5A-10 — 8'

11) Siltstone + shale, yellow to green-gray,  
— 48'

12) Ls., gray weathering, 3" to 1' beds,  
thin ( $\frac{1}{2}$ ) shale interbeds — 4'

13) Sandstone - siltstone sequence,  
tan to orange-brown weathering - 62'

14) Ls., calcarenite, gray, 3-6" beds - 5'

15) Sandstone, orange-brown, 6" to 6' beds,  
calcareous cement — 56'

16) Calcarenite, tan-gray weathering, 2" to 3'  
beds, irregular bands of clay  
(3 cycles) nodules, grades upwards into  
grayish sandstone beds, at 56-60'  
there are several lenses of shell hash w/  
silicified fossils — Call. 5A-16 at 60' — 137'

17) Ls., brown-yellow weathering, 6" to 2' beds  
scattered white clay patches, cliff former,  
spheroidal with purple weathering patches,  
pitted surface — 25'

18) Ls., brown-gray weathering, 6" beds — 17'  
Unconformity — 8' of relief in  
100 yards along ridge

19) Dolostone, brown gray, rubbly  
cemented by clear calcite matrix —  
forms top of ridge — 65' +

↑  
Start here



## Section 5

Section at West end of Road Canyon  
 King's fault contact by the Word against  
 Verdo is true, although there is  
 possibly a fault 100 yards further  
 up the hill

9 S 45° to the  
 SW

Vertical

10 dolostone, brown-gray with large  
 clear Calcite Stalls and a calcite matrix  
 (Call of this) ————— to top of 10.

uncertainable contact

second (?) great?

9 ls., calcilute, yellow-brown 2"-6"  
 beds with chert nodules ————— 12'

8 Ss., dark brown weathering, siliceous  
 bands with calcareous cement  
 when calcite cement remains weather  
 light-yellow-brown ————— 32'

7 ls., calcilute, yellow brown weathering.  
 brown on fresh surface — 1" to 2" beds  
 patches of cherty Stalls — 20'

6 ls., mudgray, massive lenses  
 1" to 4" thick in rocks like  
 above unit ————— 12'

5 ls., yellow-brown weathering,  
 brown chert nodules, 0" beds ————— 18'  
 Coll. of fractured fine bone —

4 Ss., dark yellow-brown weathering,  
 1" to 3" beds chert & stalls ————— 8'

3 ls., yellow brown weathering, brown  
 chert nodules, 6" to 1' beds ————— 10'

2 S.s., dark brown, siliceous, — 6'

1 ls., light gray weathering, platy,  
 (probably top of sandstone) — 10'  
 exposed

— Covered beneath



## Section 4A

7/26/59

Examined the middle of Kew's Sect. 12, Hursthill  
and remeasured in part, see books

Then drove to Hess-Hall boundary fence  
and measured from road north to the top  
of the ridge and across the rolling slopes 408 yds.  
Section along Hess-Hall boundary fence

1) ls, dark gray, silty fissile fossil brachi. 3' to 6'  
beds

20' ±

2) Covered, probably siliceous shale — 126'

3.) ls, mud gray, finely laminated, very  
silty with bands of brown siliceous  
replacement, lenses of fossiliferous calcareous  
(call 10' from top) — 84'

4) Dolostone, dirty gray, 5' beds,  
a yellow weathering 15' 6" about 20' up,  
40'

5.) Shale, red-brown weathering, 10'  
6) like 4 below — 30' ±

1st 10' of 15'



7/27/59 Dugout Mt. Section

Section 7- dip 14

Siliceous siltstone below

1) Ls., mid gray weathering, 1 to 2' beds, bands of brown siliceous, fossil hash, conglomerate, chert pebbles up to 1" diam. 24'

2.) Ls., mid gray, lenses of shell hash up to 6' thick, silicified nodules common, Coll. 7-2 3' up become interbedded with bluish gray calcareous siltstones -

Coll. 7-2 B - 31' up  
shale breaks at 35' + 40'  
Total - 53'

3.) Shale, siliceous with chert bands, and thin ls. carbonates 8'



4) Calcinedite, brown weathering, 6" cobbles in 4' beds and shale, a. L. c. corals, red brown in 6' beds. Calcinedite has abundant siliceous corals. 27'

5) Calcarenite, gray, 1" grading up into grayish s.s. 12'

6) Calcarenite, med to dark gray, 1' beds, Coll 7-6A - 1" up?

(cephalopods)  
(bivalves)  
to the west  
a few pebbles - calcarenites have  
siliceous through the pores - get  
brown weathering color.  
upper part a conglomerate -  
dolomitic also in patches

— 18'

7) Sandstone, red brown weathering, and conglomerate chert pebbles in a dolomitic + siliceous matrix, 4 repetitions - 30'

8) Ls., brown weathering, shell hash, some beds conglomeratic, siliceous deposits in beds, 1' to 2' beds, 40' to top of knoll

To the west these beds change facies into orthoquartzitic, siliceous shales, to a larger extent.

above beds which I think are the same as unit 8 there are

9) Sandstone and shale, friable, yellow and red brown weathering, some bands of dark brown siliceous shale. 30'

10) Sandstone, light brown, orthoquartzites and thin bed of shale 15'  
(6° WNW dip)

11) Covered above, some beds are exposed but strata are recognizable and apparently the sequence is broken by several faults

(top 525' set)

400'



12) Shale, yellow & brown weathering, - part  
silicous 25' exposed

13) Conglomerate, local lenses - 30'

14) S.s. + shale, gray + yellow - 232'

15) Ls, yellow gray weathering, finely  
laminated with some shaly bands,  
lenses of calcarenous - Coll 7-15A - 5' up  
Coll 7-15B 12' up  
" 7-15C 17' total 77'

16) Shale, yellow-brown, finely  
laminated, lenses of calcarenous  
with fossil hash 14'

17) Ls, mud gray, 1' massive beds, fossiliferous  
calcareous Coll. 7-17A. - 1' up - 2'

18) Shales + S.s., red-brown to yellow,  
thinly laminated, silicous, one  
6" calcilutite bed in middle - 10'

19) Ls, mud gray, conglomeratic in lower  
part, calcarenous higher -

Coll. 7-19A - 6" up

7-19B - 1½' up - 2'

20) S.s., brown to red-brown weathering, silicous,  
thinly laminated, 1" beds, frustules 260'

21) S.s., brown-red, cliff former, 6" to 3' beds,  
conglomeratic, 60'

22) Ls., dark gray, conglomeratic - 21'

23) Covered 37'

24) Ls, light gray to chalky weathering, a  
series of ledges, fossil hash - 35'

~~fault Hogsback~~ (dag tot die ESE)

25) Calcareous, light gray to brown weathering  
2" to 1" beds.

Coll. 7-25A 6" up

Coll. 7-25B 10" up - 12'



26) Crust

dip 14° to the WNW

27) ls., brown weathering, 1' to 3' bed,  
X bedded locally, congl. in bands -  
10' up a Capitanos locality  
Coll. 7-27A

- 110'

28) ls. dark gray, 6" beds, calcarenous

7-28A - 5' up

7-28B - 12' up

20' of light brown calc. ls.

7-28C - dark gray ls. 4' up

12' of brown siliceous shale + siltstone

8' of ls. black, 7-28D 6' up

10' of siliceous shale

4' of v. gl. l. calcarenous 7-28E

29) Ss., brn + siliceous sh. 62'

30) ls., calcarenous, yellowish + siliceous

50' up alternating in cycles - chest nodules  
common in upper part 175'  
as far as measured.

31) Grey Capitan dolomite

↑ Start Here

7/28/59 -

Tried to check down Kigs  
section up Little Blue Mts - met  
a Mr. Mills who was a great -

The fossiliferous Kigs Sect 17, p. 77  
are mostly funny spots in the ls.  
but are what apparently fossiliferous.  
His thickness here is about right.



7/29/59

Section 2A

Walter's Falls Ranch.

Continued below Sect. 2A

1) Dolostone, brown to gray-brown  
weathering, 1 to 2' beds, chert pebble  
lenses 481

2) Ls, med. gray, 6" to 1' beds, fossiliferous  
many calcarenous:

Call 2A-2A	24' up
2A-2B	26' up
2A-2C	31' up
2A-2D	43' up
2A-2E	48' up
2A-2F	62' up

(platy-<sup>upper</sup>  
20') 2A-2F 671

3) Ls, gray, 1-2' beds, abundant fossiliferous,  
almost 9 fossiliferous ls in total -

Call. 2A-3A - 2' up - 14'  
→ <sup>is</sup> base of the word

4) Dolostone, probably blue <sup>and</sup> 3 below originally



Sect. 2 B - Full ranch

4.) Dolostone, gray-brown weathering,  
pitted surfaces (relic groundwater),  
1'-3' beds, poorly silicified brachiopod bed  
about 25' up — Total - 85'

5.) Dolostone, light gray in lower  
200' becomes mud gray in upper  
part — ext. — 700'  
1-3' beds

